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THE INFLUENCE OF THE TRUCK UPON THE MARKETING OF FRUITS AND VEGETABLES[1]

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One of the most far-reaching factors in the marketing of fruits and vegetables in recent years was the improvement of the truck and the coördinate development of good highways. The changes in marketing brought about by the extensive use of motor trucks have not been entirely an unmixed blessing. That this development has opened up an avenue to profitable markets for many growers is self-evident to one acquainted with eastern agriculture. In Erie County, Pennsylvania, grape growers who trucked their grapes to market averaged 37 cents per hour of man labor on grapes and those who shipped by rail averaged 10 cents per hour for all labor on grapes.[2]

Another benefit, advantageous to producers and consumers alike, comes from the fact that truck distribution has made fresh fruits and especially vegetables available in every town, village, and hamlet throughout all seasons of the year, stimulating all year consumption, to the advantage of the health of consumers and the profits of the producers.

That it has brought additional competition for the growers nearest to market is also evident. This is felt so keenly by many growers close to the larger cities that there is a strong sentiment among the growers around certain cities for markets owned and controlled by growers of the county in which these cities are located or at least limited in use to near-by growers.

The greatest disadvantage resulting from increased truck ar-

[1] Paper read at the twenty-first annual meeting of the American Farm Economic Association, Cleveland, Ohio, December, 1930.

[2] Vandenburg, J. T., Jr., and G. P. Scoville. Growing and Marketing of Grapes in Erie County, Pennsylvania. The Penna. Agr. Exp. Sta. Bul. 260, p. 30, table 28.

rivals, however, is the disorganization of market news reporting, inspection service, licensing of dealers and a marketing procedure designed to put order into a distribution system based on railroad transportation.

New market organization and market equipment, as well as additional government service, are essential to meet the needs of the changed conditions but these can be discussed more advantageously, no doubt, after a brief presentation of the scope of truck movement to market in some of the eastern states.

The Truck as a Factor in Supplying Pennsylvania Cities with Apples

A survey of the wholesale and retail trade handling apples in 17 Pennsylvania cities during the summer of 1927 shows that truck arrivals were a very important part of the apple supply in these cities, as indicated in Table 1. The percentage arriving

TABLE 1.—PERCENTAGE OF APPLES IN 17 PENNSYLVANIA CITIES THAT ARRIVE BY TRUCK, 1926 CROP YEAR

Cities	Western apples (Bushels)	Eastern apples (Bushels)	Per cent eastern	Per cent of eastern retailer bought from farmers	Per cent of total retailer bought from farmers	Per cent of total wholesaler received by truck or wagon	Truck receipts by wholesaler and retailer in per cent of total
Chambersburg	28	2,961	99	100	99	1	100
Coatesville	25,416	17,264	40	68	27	6	33
Connellsville	17,774	34,972	66	13	9	0	9
Dubois	5,754	8,380	59	11	7	21	28
Erie	65,489	629,215	91	25	23	2	25
Harrisburg	20,531	130,445	86	78	67	4	71
Huntingdon	1,144	3,416	76	100	76	0	76
Johnstown	45,293	247,759	85	86	73	3	76
New Castle	54,720	192,210	78	62	48	6	54
Pittsburgh	764,977	1,307,378	63	4	3	1	4
Philadelphia	870,082	850,709	49	15	7	23*	30*
Reading	100,905	299,487	75	80	60	7	67
Scranton	46,920	214,579	82	72	59	14	73
Shamokin	7,610	42,862	85	61	52	1	53
Washington	35,417	20,704	37	60	22	0	22
Williamsport	25,232	60,205	70	61	43	5	48
York	11,894	213,466	95	49	47	6	53
Total	2,099,186	4,276,012	67	37	24	8	32

* Includes l.c.l. receipts.

by truck depends largely on the size of the city and its proximity to good local producing areas. Redistribution of carlots of apples from the larger cities to the smaller ones, by truck, is also an important factor in truck receipts. That there is considerable of this redistribution, practically all by truck, even from cities of moderate size is shown by the estimates of individual wholesalers given in Table 2.

TABLE 2.—PERCENTAGE OF APPLES HANDLED BY WHOLESALERS WHICH THEY REDISTRIBUTE TO OTHER TOWNS, 1926 CROP YEAR

City	Dealer	Percentage distributed			Distance hauled (miles)
		Boxes	Barrels	Baskets	
Chambersburg	1	None	None	None	—
Coatesville	2	50	50	—	40
Coatesville	3	10	10	—	40
Connellsville	4	—	66	—	—
Connellsville	5	25	25	25	—
Dubois	6	—	—	50	—
Dubois	7	90	90	—	—
Dubois	8	80	80	80	30
Erie	9	—	—	—	15
Erie	10	8	8	8	—
Erie	11	15	15	15	—
Erie	12	20	—	20	—
Harrisburg	13	35	10	—	—
Harrisburg	14	25	—	—	—
Harrisburg	15	66	—	—	—
Harrisburg	16	25	—	—	—
Harrisburg	17	10	10	10	—
Johnstown	21	20	—	—	—
Johnstown	22	—	20	—	—
Johnstown	23	—	25	—	—
New Castle	24	—	—	—	3–8
New Castle	25	25	25	—	3–10
New Castle	26	—	—	—	—
New Castle	27	—	—	—	10
Reading	28		Almost none		2–50
Reading	29		Almost none		—
Reading	30	—	—	—	—
Reading	31	—	—	10	—
Reading	32	—	—	—	—
Reading	33	—	—	—	—
Reading	34	1	5	—	8–60
Scranton	36	—	—	—	—
Scranton	37	10	10	10	30
Scranton	38	5	5	—	50
Scranton	39	—	—	—	75
Scranton	40	—	—	—	—
Scranton	41	—	—	—	—
Scranton	42	—	—	—	16
Shamokin	43	25	—	—	—
Shamokin	44	50	—	—	—
Shamokin	45	35	—	—	—
Washington	46	40	—	30	—
Williamsport	47	60	—	60	60
Williamsport	48	20	20	—	—
Williamsport	49	67	—	67	—
Williamsport	50	—	—	5	30–40
York	51	10	10	10	8
York	52	—	—	—	—
York	53	—	—	60	—
York	54	—	8	—	20

The data in Tables 1 and 2 indicate that approximately 32 per cent of the apples sold through the wholesale and retail stores of these cities arrive by truck. If Pittsburgh and Philadelphia are omitted, truck receipts amount to approximately two-thirds of the total receipts. For an accurate picture of the importance of the truck in apple receipts, there must be added to these figures apples sold direct to consumers by producers, or by hucksters who buy direct from producers. In the larger cities this constitutes a very small part of the apple consumption, but in some of the smaller cities it is a very considerable part. In Williamsport, for example, dealers estimated that 50 per cent of the apples are sold direct by farmers to consumers, while in Johnstown the

dealers estimated that 50,000 bushels or approximately 15 per cent were sold in that way.

Truck receipts have become, no doubt, an even more important part of the apple supply of these cities in the last five years. The report of the Pennsylvania Department of Agriculture shows that for the 15 cities in which it collects carlot data, the carlot arrivals were 7,434 cars in 1923, 6,117 cars in 1926, and 5,255 cars in 1929. The 15 cities in this report are not identical with those in our study but include all the larger cities included in our survey. The decrease in carlot receipts of apples in the six years from 1923 to 1929 was equal to 29 per cent of the 1923 receipts, in the face of a growing population in these cities.

More detailed information for the City of Philadelphia for the current year is available as the Federal-State Crop Reporting Service has endeavored to get information on truck arrivals of fruits and vegetables on the Dock Street and Callowhill Street markets. Arrivals of apples by truck on these two markets in August amounted to 136,070 bushels, in September to 136,676 bushels, while carlot receipts of apples in August, 1929, were only 15 cars and in September 183 cars. For November, 1930, truck receipts were 59,780 bushels and car receipts 394 cars in November, 1929.

The report of the Bureau of Agricultural Economics shows that the equivalent of 1,360 carlots of apples left western New York by truck in the season of 1928 or 11 per cent of the shipments of that crop. In western Maryland 19 per cent of the 1928 crop was shipped by truck and in south central Pennsylvania 16 per cent.

What has been said of apples arriving by truck holds equally well for other fruits. Truck arrivals of peaches in August were 96,027 bushels and rail arrivals 142 cars, while in September, 95,271 bushels came by truck and only 11 cars by rail.

Truck Receipts of Vegetables in Philadelphia

To show the extent to which vegetables are trucked even to the larger cities, the data for carlot and truck arrivals in Philadelphia are of interest. In the month of September, 1930, the truck arrivals of vegetables were equivalent to about 2,110 cars[3], while the carlot arrivals of vegetables for the corresponding month in 1929 were 2,517 cars. Truck receipts were about 46 per cent of the total receipts.

[3] Figures in the truck report were converted into carlots by allowing 600 bushels or 30,000 bunches per car.

For the month of November, 1930, truck arrivals of vegetables amounted to the equivalent of 853 cars, while 2,161 carlots came in by railroad. For the month of November, truck receipts were approximately 28 per cent of the total arrivals by rail and on these two wholesale markets. These figures do not take into account the truck arrivals that are jobbed by the trucker from store-to-store or from house-to-house nor those sold in the 13 retail markets of the city without going through these two wholesale markets.

While data on truck receipts for other cities in Pennsylvania are not available, the carlot receipts in Allentown decreased from 1,836 cars received in 1925 to 984 in 1929. Altoona dropped in carlot receipts from 2,212 to 1,292 during the same time. Bethlehem, Easton, Harrisburg, Johnstown, Lancaster, Reading, and York all have shown the same tendency.

Even in New York City, which is rather inaccessible to trucks, it is estimated that 9.6 per cent of the fruits and vegetables on the jobbers market arrive by motor truck, while in the month of August, 1929, 35.5 per cent of the receipts on all markets came by motor truck.

Public Produce Markets in Up-State New York

In the State of New York the changes in marketing coincident with the development in truck transportation have had such a widespread effect in giving the public markets in the larger upstate cities a regional and state-wide rather than a local significance that the legislature two years ago authorized a survey of these markets for the purpose of studying their place in the marketing system of the state, as well as their needs in order to serve producers and consumers to best advantage under present-day conditions. The remainder of this paper will be devoted largely to the results of that survey.

Volume of Business

The total volume of sales on the four leading markets in upstate New York varied from $3,000,000 on Elk Street market in Buffalo to almost $4,000,000 on the public market in Rochester, while the Albany and Syracuse markets each handled about $3,700,000 worth. These sales consisted almost entirely of produce grown in New York state and brought to the market by the grower or by a trucker-dealer who buys produce at farms to sell on the market.

The volume of business done by the commission houses dealing in fresh fruits and vegetables amounted to $6,800,000 in Albany, $7,000,000 in Syracuse, $8,000,000 in Rochester and almost $21,000,000 in Buffalo. Of these amounts from 80 to 90 per cent represented shipped-in fruits and vegetables grown outside of the state.

The most important agency retailing fresh fruits and vegetables is the grocery store. Recent developments in chain grocery stores have put fresh fruits and vegetables into practically all of these stores and while the old line independent grocer has handled fresh fruits and vegetables for years, the real importance of these commodities as a means of attracting buyers to the stores has only recently been fully appreciated by those interested in all forms of grocery merchandising. The grocers of Albany retailed almost $2,000,000 worth of fresh fruits and vegetables last year, those of Syracuse about $3,600,000 worth, those of Rochester about $5,750,000 worth and those of Buffalo about $12,750,000. Of the above amounts approximately 40 per cent were home-grown produce arriving by truck. That the public market is an important factor in supplying fresh fruits and vegetables to the grocers is shown by the fact that in Buffalo grocers bought 31 per cent of the home-grown produce on these markets and in Albany, Rochester and Syracuse from 60 to 75 per cent of the home-grown fruits and vegetables were bought on the markets.

A second group which is of importance in the retailing of fresh produce is the huckster who is licensed by the city or the state to sell produce from house to house. These men buy on the public market and from commission houses and peddle on the streets of the city, thus taking over a retailing function formerly done to a greater extent by farmers themselves. The volume of business done by hucksters last year amounted to a little less than a $1,000,000 in Albany, to just about $2,000,000 in Buffalo and in Syracuse, and to $2,300,000 in Rochester. The percentage of home-grown produce in the sales by hucksters varied from 38 per cent in Buffalo, to 45 per cent in Albany, 48 per cent in Syracuse, and 52 per cent in Rochester, practically all of which was bought on the market, and all represented truck receipts.

The sales to consumers direct on the public markets were from $800,000 to $900,000 in Albany and Syracuse but less than $300,000 in Rochester, while on the Elk Street market in Buffalo only about $100,000 worth is sold direct to consumers. In Buffalo

there are three other markets, strictly retail on which about $300,000 worth of home-grown produce is sold to consumers by the growers. Very little selling direct to consumers is done by the vegetable gardeners. The small farmer who brings in a small load very miscellaneous in character sells more to consumers.

Character of Produce Handled

The commodities sold on the public markets included vegetables, fruits, berries, butter, cheese, flowers, plants, live and dressed poultry, as well as all classes of dressed meats produced on the farm. Of these, vegetables constituted the major portion of sales on all the markets. They made up over 80 per cent of the sales in Buffalo, 70 per cent in Rochester, 67 per cent in Albany, and 55 per cent in Syracuse. A large number of trucker-dealers sell on the Rochester and Syracuse markets. They handle twice as much fruit as vegetables and over three and one half times as much poultry and eggs as vegetables on the Syracuse market. Vegetables constitute only 13 per cent of the trucker-dealer sales on the Syracuse market but 81 per cent of the sales by growers. On the Rochester market, however, two-thirds of the trucker-dealer sales consisted of vegetables. Fruit constituted less than 10 per cent of sales on the Elk Street market in Buffalo, but from 15 to 20 per cent on the other markets. The controlling factor that brings buyers to all of these markets is the quality and supply of vegetables offered for sale.

The Producing Areas Served by These Markets

From 9 to 39 per cent of the products came from distances more than 20 miles from these markets, and from 3 to 10 per cent more than 40 miles. In the case of the Albany market, over 4 per cent came more than 100 miles. Sellers on the Rochester and Syracuse markets have been required to register since July, 1926. From that date to July, 1929, 1,821 growers registered to sell on the Rochester market. These growers came from 14 counties. In the same period, 3,686 growers from 27 counties registered to sell on the Syracuse market. The wide area from which growers come to these markets indicates the regional character of the markets so far as an outlet for produce is concerned. That the area widens as more good roads are built is shown by the registration of growers from year to year on the Rochester market. No sellers were registered prior to July, 1926. From July 1, 1926, to June 30, 1927, there were 1,102 growers regis-

tered. Of this number 903 or 82 per cent came from Monroe County. During the year from July, 1927, to the end of June, 1928, 438 were registered of whom 220 were from Monroe County. The registrations from Wayne County were 10.6 per cent of the total the first year and 29.5 per cent in the last year. The producing areas which depend in part on these markets are, however, wider than these figures indicate. Approximately 40 per cent of the products sold on the markets in Rochester and Syracuse are not sold by the grower but by trucker-dealers who tap practically every county in central and western New York. Some of these men have regular routes over which they buy produce every week, while others visit any section within a radius of 100 miles from these markets where produce is available at the particular season. Most of the trucker-dealers specialize. Some handle only poultry and eggs. Others bring in berries in the spring and summer, turning to peaches, apples, and potatoes in succession as these crops become ready for market. The development of the trucker-dealer business is a direct result of the building of good roads and of motor trucks.

From the standpoint of the consumer the trucker-dealer makes available many products that would otherwise not find their way to these markets. From the standpoint of the farmers distant from good markets they provide a market which is far superior to the neighborhood grocery store or local dealer and in most cases far superior to rail shipment. From the standpoint of the wholesalers and jobbers in these cities, they frequently furnish keen competition but they are also used by the trade as an outlet for odds and ends. To the grower who sells on these markets the trucker-dealer is often an unwelcome competitor and frequently one who employs methods which are distasteful to the grower if he has to occupy a stall beside him. That he is not an unmixed evil is indicated by the fact that many growers on the market recognize that the trucker-dealer is an important factor in keeping a constant volume of business on the market throughout the year. By keeping a supply of produce on the market during the "off seasons" they keep enough buyers coming to the market at all times so that growers feel confident of finding buyers for such products as they wish to bring in at any time. Inasmuch as the trucker-dealer uses the market much more regularly than the grower who sells only his own produce, he is usually charged from 50 to 100 per cent more rental for a stall. Probably even a higher rental would be justified out of fairness to other business

men in the city with whom he competes but in return he should be given as good quarters as any other sellers on the market. By giving them good facilities and charging an adequate rental, irresponsible dealers are kept off the market and at the same time the income thus derived makes it possible to charge moderate rentals to growers and still operate a market without a deficit. Ample justification for such a policy is found in the fact that the grower selling his own produce is the key to a successful produce market. Rapid decline of business has occurred on many markets where dealers were permitted to become the major portion of the sellers. Since the growers' section of the market is essential to the trucker-dealer, it is fair that he should help to support it.

Methods of Sale on the Markets

The bringing of large loads over long distances by truck has brought about changes in the merchandising methods. These markets which were established years ago, in order to enable growers to sell direct to consumers perform that function today in only a limited way. There is less and less buying on the part of consumers and the public markets have become largely wholesale markets where growers and trucker-dealers sell to other retailers. The percentage of sales to various groups of buyers on each of these markets is shown in Table 3.

TABLE 3.—PERCENTAGE OF SALES TO VARIOUS GROUPS OF BUYERS ON THE MARKETS IN ALBANY, ROCHESTER AND SYRACUSE, AND THE ELK STREET MARKET IN BUFFALO, 1929

Classes of buyers	Albany	Buffalo	Rochester	Syracuse
Commission houses	5.3	15.9	10.8	8.6
Truckers supplying other cities	46.7	4.0	11.4	26.1
Hucksters selling in city	11.9	28.4	30.1	19.3
Grocers	13.9	47.9	40.4	21.1
Consumers	22.2	3.8	7.3	24.9
Totals	100.0	100.0	100.0	100.0

Consumers purchased relatively large amounts of poultry, eggs, dairy products, and meat. On the Syracuse market the poultry and eggs sold to consumers amounted to twice as much as the vegetables. On the Albany and Rochester markets poultry and eggs bought by consumers were exceeded slightly by purchases of vegetables, but of the sales to all buyers on these two markets, vegetables constituted from 67 to 71 per cent. Among the purchases on the market by truckers who supplied grocers in other cities, later referred to as inter-city truckers, vegetables

constituted from 63 to 93 per cent, showing that the supply of vegetables is the factor that keeps these men coming to the markets. Among the purchases by grocers, vegetables predominate almost as in the buying by inter-city truckers. Since these two groups buy from 50 to 60 per cent of the products sold on these markets, it shows that the modern trend in produce markets, which is decidedly toward wholesale markets, makes vegetables the determining factor in their growth. Most of the vegetable gardeners, who bring less diversified loads than do the general farmers, are in favor of the discontinuance of selling at retail. That their ideas are probably economically sound is indicated by the fact that those who sold less than 50 per cent to consumers sold 43 per cent more goods per hour than those who sold over 50 per cent to consumers. The costs of marketing in the latter group averaged over 13 per cent of the value of the load, while for the former group less than 9 per cent.

Consuming Areas Served

The effect of the motor truck in developing a regional interest in these markets is also illustrated by the volume of inter-city trucking from the cities where these markets are located. These markets and the carlot receivers, located on sites adjoining the markets, each supply from half a million to a million and a quarter dollars' worth of produce to cities and small towns lying more than 60 miles away, while from the four markets inter-city truckers haul over $14,000,000 worth of produce of which about $6,000,000 worth is hauled over 40 miles. The total trucked from each city was estimated by getting records from a number of inter-city truckers and also as complete a list as possible of all inter-city truckers from the wholesalers and growers who sold to them and applying the value of the loads in the records to all the truckers on the list. By getting the wholesalers to divide all inter-city truckers on the list into large, medium, and small, fairly accurate allocations were possible.

The large amount of home-grown produce trucked out of Albany is due to the fact that Vermont, western Massachusetts, the Adirondacks, and the Catskills represented vast areas that are not well adapted to the production of fruits and vegetables. The large amount of shipped-in produce goes largely to the cities of the Hudson Valley and in the areas mentioned above that are too small to receive solid carlots of western and southern produce.

The amount going within a distance of 20 miles from Albany

is increased by the fact that some wholesale firms have houses in Albany and also in Schenectady or Troy. These firms unload cars in Albany and truck part of the produce to the other two cities.

Syracuse, located centrally so far as producing and consuming areas are concerned, has developed a large inter-city business, over 35 per cent of which goes more than 60 miles from Syracuse.

Buffalo is the source of over $4,000,000 worth of produce trucked to other cities but less than 4 per cent was purchased on the market. Congested conditions on the Elk Street market discourage farmers and inter-city truckers from doing business there.

The inter-city truckers have almost entirely replaced the less-than-carlot shipments by which many small cities were supplied in the past. The two large brokers in Buffalo whose business is almost entirely represented by express or l.c.l. freight shipments say that their business has declined from 65 to 90 per cent in the last 15 years because cities within a radius of 100 miles which formerly were dependent upon them for small lots of specials now have this service available at their doors daily or at least two and three times a week through the work of the inter-city truckers. The 10 or 15 per cent of the brokerage business which still remains in Buffalo consists largely of high class specials for a group of small cities located from 125 to 175 miles from Buffalo. A belt including Binghamton, New York; Elmira, New York; and Dubois, Pennsylvania, furnished most of the brokerage business for Buffalo. This belt is somewhat beyond the area served by inter-city truckers from Buffalo. The inter-city truckers have done more than any other single group to promote the consumption of fresh fruits and vegetables by making these products available twelve months in the year in every town and village, no matter how small. Such a distribution was entirely impractical when dependence was entirely upon the railroads for transportation.

From the data thus far presented, it is evident that markets which were designed to accommodate a grower selling from a wagon to the housewives of the city have become obsolete under present-day conditions of traffic and merchandising practices. Chain grocery stores and independent grocers have made fresh fruits and vegetables available in every neighborhood in our cities and towns at prices only slightly above those prevailing

for retail selling on the markets. Distribution of shipped-in, as well as home-grown produce by motor truck from the large centers of population to the smaller cities and towns, have made these products available 52 weeks in the year to almost every housewife, no matter where located. These conditions call for markets designed for transfer of produce from truck to truck, for selling of large loads in a reasonably short time, for the sale of home-grown and shipped-in produce in close proximity to each other and for market areas with ample traffic and parking facilities for the movement of large numbers of trucks and automobiles.

That these markets should not be entirely controlled and dominated by the political regime of single cities is plain from the wide producing and consuming areas which they serve.

The Special Committee appointed by the New York State Conference of Mayors at the request of Governor Franklin D. Roosevelt to study the problem of food distribution in New York State recommends that "Since farmers, wholesalers, grocerymen, consumers in the city and consumers in other cities and villages over a wide territory are served by these regional markets, such markets should not be controlled by any one local interest. The Committee believes that the best method of ownership is by the state, or the state in cooperation with the city, or with one or more counties or both."

To these recommendations of the Committee might be added ownership by the city and one or more counties, or by a cooperative organization of the growers. For the purpose of obtaining the adoption of uniform practices throughout the state in regard to grading, packing, and market and price reporting, however, state participation is desirable.

Some Needs of Modern Markets

The extensive movement of fruits and vegetables have made most of our markets deficient in two very important aspects.

Market news reporting is woefully inadequate under present conditions since it covers less than half the produce arriving in many of the markets. This can no doubt be remedied by extending reporting so as to cover truck arrivals. It is in reporting expected arrivals, however, that the serious difficulty arises. Neither the sellers nor the buyers can possibly know what volume of a commodity will be in a market before the day is over, when unreported truck loads of enormous volume may arrive at any

time during the marketing period. Some measure of relief might result if all unannounced loads were denied access to the market. Those who truck to the market daily or at regular intervals could register their next load when on the market. Others could be required to wire size and content of load at least 12 hours in advance of the time they would be admitted to the market. Such information combined with present data on expected arrivals would tend to bring some measure of order out of the chaos which trucking has created on most markets.

This problem, as well as the waste of time and effort on most markets which is due to inadequate traffic and parking facilities and to a lack of concentration of produce, both shipped-in as well as local, regardless of whether it arrives by rail or by motor truck, points to the need of a perishable food distribution center in all cities.

Plans for a Food Distribution Center

Some of the essentials in a well planned market for any city of less than 1,000,000 population are centralization of the perishable produce business both home-grown and shipped-in,[4] direct rail connections with the railroads carrying shipped-in produce, adequate facilities for easy transfer of produce from seller to buyer, convenience for the buyer to see all the produce offered for sale, free movement of traffic over the market area, equalization of the selling advantage of the various sellers' positions on the market, and fees that are not prohibitive to the small grower.

The available space for a market, the shape of the area, the routes over which produce comes to the city, and the proportion of sales to the various types of buyers must all be considered in determining the layout which is best adapted to any city.

Joint Produce Yards and Terminals

One very desirable factor is a joint perishable produce yard to which all railroads bringing fresh fruits and vegetables into the city will have access on an equal basis. A yard owned and controlled by one railroad to which other roads have a switching privilege at a definite rate is a gesture in this direction but does not meet the requirements. The saving of time in getting cars placed is too vital in the produce business for one railroad to be at the mercy of a competing road for switching serv-

[4] Decentralization in very large cities is deemed essential by some but the lack of success in efforts to decentralize the produce trade in New York City indicates that there is some doubt of the wisdom of decentralization even in the largest cities.

ice. The elimination of wasteful competition among railroads in building yards and terminals would provide sufficient saving that the Inter-State Commerce Commission might well consider the compulsory provision of joint produce yards and terminals in any city where it is asked for by the market authorities.[5] This would constitute a step of prime importance in the elimination of waste and inefficiency in the handling of the city food supply.

Type of Terminal for the Produce Trade

The type of terminal is also of vital importance. During the last three to five years some very interesting developments in this line have taken place. In April, 1927, the New Haven Railroad opened in Boston what may be considered the first perishable produce terminal built in the vast consuming area of the eastern United States. Since that date similar terminals have been opened in Philadelphia, Pittsburgh, Detroit, and other cities. These terminals tend to separate the carlot receiving business from the jobbing business. On these terminals from 10 to 25 packages usually constitute the minimum-sized sale. All selling must be done within certain rather limited hours, usually from 7 to 10 A.M. and there generally is a penalty for the holding of produce from one day to the next. One advantage of such a terminal is that it tends to clean up each day's supply on that day.

A type of terminal that is better adapted to the cities in upstate New York and other eastern cities of similar size was opened at Providence, Rhode Island, in April, 1929, and a quite similar one at Cleveland, Ohio, in June, 1929. These are not railroad terminals as much as they are produce houses built in conjunction with the produce yards of the railroads. The one at Providence has direct rail connections so that cars may be unloaded direct to the sales floor of the houses as desired. This seems to be a very desirable feature as it eliminates a lot of unnecessary trucking and congestion.

Since the number of strictly carlot receivers is very limited in cities of less than 1,000,000 people, and since convenience dictates that buyers should be able to procure both wholesale lots and job lots of shipped-in produce in close proximity to where they purchase home-grown produce from the growers, a terminal of the Providence and Cleveland type should be a part of any

[5] The City of Los Angeles has just recently won such a victory in regard to a union passenger terminal after three years of litigation.

well planned market center in the cities from 150,000 to 1,500,000 population.

Details of a farmers' market cannot be treated in a paper of this character but the keynote must be easy transfer of goods from sellers' to buyers' trucks, free traffic flow, adequate parking facilities, separate provisions for growers and trucker-dealers with from two to three times as large a fee for the latter, some shelter for the winter, and management free from city politics with adequate authority to enforce rules for the protection of buyers as well as the honest sellers against the practices of the unscrupulous and to carry out an adequate system of market reporting.

THE INFLUENCE OF THE TRUCK IN MARKETING CORN BELT LIVESTOCK[1]

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Transportation has always been an important factor in our economic life. Those marketing livestock have used the dominant form in each epoch of our transportation history.

In the early toll road development herds of livestock were driven to eastern markets. As improvements in transportation have come along, livestock has been marketed and has adjusted its system with each new form.

We have passed through the toll road and canal stages in our transportation history to that of the railroad. But today, railroad transportation is being supplemented by another development in our highways, as well as by increased use of air transportation. The rapid improvements in our transportation system within the past decade have necessitated alterations in our systems of marketing. This is particularly noticeable today in the field of livestock marketing. During the last few years the marketing of livestock by motor truck has become the dominant method in many areas, particularly in the corn belt.

First let us review the amount of livestock trucked to some of the important terminal markets. Stockyard companies classify livestock receipts as "rail" and "drive-ins." A few of the river markets also include receipts by boat, but these are relatively unimportant. The class of receipts called "drive-ins" is the group in which we are interested. Before the advent of the truck, considerable livestock was driven in on foot, especially in the early droving days.

By comparison of this so-called classification of "drive-ins" we are able to study the amount of livestock arriving by truck at our principal terminal markets. For this comparison I have selected two Ohio markets, Cleveland and Cincinnati, which are more or less representative of the eastern part of the corn belt; Indianapolis, which is a little farther west, but still representing the eastern part of the corn belt; Chicago and East St. Louis, which are more or less representative of the middle part of the corn belt; and Omaha and Sioux City, representative of the western part of the corn belt. These seven markets I believe are

[1] Paper read at twenty-first annual meeting of the American Farm Economic Association, Cleveland, Ohio, December, 1930.

TABLE 1.—TRUCK RECEIPTS FOR THREE YEARS AND PERCENTAGE INCREASE 1929 OVER 1920 AND 1928

	Year	Cincinnati	Cleveland	Indianapolis	Chicago	E. St. Louis	Omaha	Sioux City	Total 7 Markets	Total 16 Markets
Hogs										
	1920	249,256	24,827	787,190	33,108	47,552	181,546	133,591	1,457,070	2,053,417
	1928	471,266	96,939	1,203,934	304,957	484,436	1,204,035	1,378,319	5,143,886	7,808,898
	1929	455,559	112,206	1,353,580	379,481	803,076	1,372,341	1,491,667	5,967,910	9,079,975
% 1929 over	1920	82.76	351.95	71.95	1046.19	1588.83	655.91	1016.50	309.58	342.18
% 1929 over	1928	3.35	15.74	12.42	24.43	65.77	13.97	8.22	16.02	16.27
Cattle										
	1920	27,127	5,090	48,158	7,213	11,560	23,143	14,111	136,402	287,243
	1928	42,636	27,038	84,850	71,014	67,420	219,706	183,273	695,937	1,235,213
	1929	42,638	32,109	100,000	100,460	100,602	281,179	249,611	906,599	1,525,426
% 1929 over	1920	57.17	530.82	107.67	1292.70	770.25	1114.9	1668.9	564.65	431.05
% 1929 over	1928	0.0	18.75	17.85	41.46	49.21	27.97	36.19	30.27	23.49
Sheep										
	1920	62,361	14,963	58,698	2,606	5,558	71,369	10,574	226,129	504,723
	1928	94,009	88,005	119,731	62,521	92,347	356,826	132,634	946,073	1,713,108
	1929	122,438	107,704	154,348	88,498	138,350	403,399	206,232	1,220,969	2,119,920
% 1929 over	1920	96.33	619.80	162.95	2295.9	2389.2	465.23	1850.3	439.94	320.01
% 1929 over	1928	30.24	22.38	28.91	41.54	49.81	13.05	55.48	29.05	23.74
Calves										
	1920	68,175	12,486	76,675	2,042	10,094	7,575	3,479	180,526	304,047
	1928	62,020	39,327	99,432	23,543	76,011	42,731	20,818	363,882	860,215
	1929	66,409	56,581	107,396	35,545	111,299	46,263	23,409	446,902	1,050,584
% 1929 over	1920	87.40	353.15	40.06	1640.6	1002.6	510.73	572.86	147.55	345.53
% 1929 over	1928	7.07	43.87	8.00	50.97	46.42	8.26	12.44	22.81	22.13

fairly typical of all our livestock markets. Then, in addition, I have compared the receipts of sixteen markets. These are: Chicago, Cincinnati, Denver, East St. Louis, Fort Worth, Indianapolis, Kansas City, Louisville, Milwaukee, Oklahoma City, Omaha, Portland, St. Joseph, St. Paul, Sioux City, and Wichita.

In attempting to analyze the growth of trucking, first let us review the amount of livestock trucked to these important markets. Three years have been taken to show this development—1920, 1928, and 1929. I have chosen the year 1920 because some of the data are not complete for a few of the markets previous to this year. By comparing the number received, we find that the truck receipts have increased greatly during this ten year period (Table 1). For the seven markets the hog receipts by truck have increased from 1,400,000 in 1920 to more than 5,900,000 in 1929, or an increase of over 300 per cent. Likewise, the 1929 truck receipts have shown a gain over 1928 of more than 800,000 head at these seven markets, or a gain of slightly over 16 per cent.

When the sixteen markets above enumerated are compared for hogs we find an increase of 342 per cent from 1920 to 1929 and an increase of 16 per cent from 1928 to 1929. East St. Louis and Chicago have shown the greatest percentage gain from 1920 to 1929. Truck receipts of hogs at East St. Louis increased 1,588 per cent, while those at Chicago increased 1,046 per cent. Cincinnati and Indianapolis showed the smallest gain for this period. The increase of 1929 over 1920 at Cincinnati was 82 per cent and that at Indianapolis 71 per cent. The smaller gain at these two markets is due to the fact that Cincinnati and Indianapolis by 1920 were already trucking a considerable percentage of their hogs to market while Chicago and East St. Louis, which showed the largest percentage gain, had just begun to truck hogs.

Cincinnati is the only one of these seven markets which has shown a decrease in the number of hogs trucked in 1929 as compared to 1928. The drop was 3.3 per cent.

Similar comparisons are found for the data on cattle, sheep, and calves as compared with hogs, both for the seven markets and for the sixteen markets above enumerated. The percentage increases are approximately the same except that they will average slightly higher for sheep and cattle than for calves. Likewise, the 1929 increase over 1928 for cattle, calves, and sheep will average higher than for hogs.

In 1929 Sioux City was trucking in more hogs than any other

market in the country, followed rather closely by Omaha and Indianapolis for second and third places. The leading truck markets for cattle in 1929 were: Omaha, Sioux City, St. Paul, East St. Louis, and Chicago. For sheep the leading truck markets were: Omaha, St. Joseph, Sioux City, Kansas City, and Indianapolis, while the largest number of calves were trucked in at St. Paul, East St. Louis, Indianapolis, Milwaukee, and Fort Worth, in the order named. When the truck arrivals of all hogs, sheep, cattle, and calves are combined, we find that Omaha tops the list of the truck markets with Sioux City, Indianapolis, St. Joseph, East St. Louis, Kansas City, St. Paul, Cincinnati, Chicago, and Wichita following in the order named.

Passing now from the number trucked, to the percentage truck receipts are of total receipts, the relative importance of trucking at these important markets can be observed. When the seven markets are compared we find that in 1920 less than 7 per cent of the hogs were received by truck. (Table 2.) There was considerable variation between markets. Only four tenths of one

TABLE 2.—PERCENTAGE TRUCK RECEIPTS ARE OF TOTAL RECEIPTS FOR HOGS, CATTLE, SHEEP AND CALVES FOR THREE YEARS

	Year	Cincinnati	Cleveland	Indianapolis	Chicago	E. St. Louis	Omaha	Sioux City	Total 7 Markets	Total 16 Markets
Hogs										
	1920	16.86	2.86	27.17	.44	1.40	6.70	6.15	6.92	6.97
	1928	30.07	12.93	53.25	3.57	12.00	37.87	50.05	22.28	23.81
	1929	32.82	18.05	63.09	4.63	20.78	43.35	64.48	27.51	28.86
Cattle										
	1920	9.66	4.38	13.74	.23	1.19	1.52	1.97	1.93	2.20
	1928	18.43	28.04	33.90	2.83	7.50	15.44	24.43	11.30	10.46
	1929	18.28	30.98	39.19	4.21	12.10	19.47	32.09	15.02	13.47
Sheep										
	1920	17.05	5.53	43.21	.06	.92	2.47	2.95	2.63	3.43
	1928	44.59	21.15	53.29	1.62	18.10	11.75	23.33	10.71	10.73
	1929	56.56	26.45	57.22	2.34	25.89	13.31	24.54	13.44	12.79
Calves										
	1920	42.57	9.47	31.09	.28	3.62	9.63	9.82	10.78	9.48
	1928	46.38	34.59	52.82	3.09	18.31	45.22	33.25	20.56	22.67
	1929	53.48	46.05	61.88	5.29	28.43	45.26	38.08	27.12	28.61

per cent were so received at Chicago, while Cincinnati and Indianapolis received 16 and 27 per cent respectively by truck. In 1929 the truck receipts of hogs had grown to over 27 per cent of the total receipts for the seven markets combined. For the combined sixteen markets, truck receipts were 6.9 per cent of all receipts for 1920, 23.8 per cent for 1928 and 28.8 per cent for 1929. Sioux City in 1929 received 64.4 per cent of all their hogs by truck and Indianapolis 63 per cent, these being the two outstanding truck markets. Chicago still remained the lowest of all, receiving only 4.6 per cent. This is true because Chicago is one of our outstanding railroad markets, while many of the

other markets depend upon near-by areas for their major receipts. When comparing the percentage of truck arrivals for cattle in 1920, again a very small percentage arrived by truck, while in 1928 the increase had jumped to 11.3 per cent at the seven markets, and 10.4 per cent at the sixteen markets, and had further increased in 1929 to 15.0 per cent at the seven markets and 13.4 per cent at the sixteen markets. In 1920, 2.6 per cent of the sheep arrived by truck at the seven markets. By 1928 the truck arrivals were 10.7 per cent and 13.4 per cent for the following year. Similar comparisons held for the sixteen markets.

While the data for 1930 is not yet complete, the indicated receipts for the first ten months at several of the markets will continue to show increased truck receipts.

Without question the trend of truck receipts continues upward for these major markets with possibly few exceptions.

So far only trucking at terminal markets has been considered. What of the vast territory in the corn belt removed from the terminal markets? Here the truck is playing an important rôle in a slightly different manner. Livestock is assembled and then shipped by rail to terminal markets or packers, or it may be delivered direct to the doors of the many interior packers scattered throughout the corn belt. Here the truck is becoming an important factor, but so far few data are available on the amount moving by truck. On the basis of general observation most of such livestock is moved from the farms by motor transportation. In a recent survey (1928) made in southwestern Ohio covering 47 townships located in 7 counties, the livestock farmer was trucking over 50 per cent of the cattle, 75 per cent of the sheep, 90 per cent of the calves, and 90 per cent of the hogs to market. These percentages would no doubt be much larger today. In general the livestock was trucked to points other than to terminal markets. That is, it was trucked to railroad yards and then by rail to market, or to local slaughterers, or to other points of disposal. This survey showed most of the hogs, calves, and sheep were trucked, while a considerable portion of the cattle were driven in. Wagons as a means of transportation for livestock have for all practical purposes been supplanted by the truck in this area of southwestern Ohio. No doubt other areas in the corn belt would show similar effects of trucking. If any one is doubtful concerning the "swing" to the truck for transporting livestock from the farms he will remove these doubts if he will place himself at some important assembling or concentration point

and observe for a period the livestock coming off the farms. Since the transportation of livestock by truck has made such a rapid growth and development let us consider some of the factors which have influenced farmers to switch over to the truck.

With the coming of motor transportation roads have been improved so that today a large part of the farms are located along improved highways.[2] The 1925 Census shows that in the Cleveland area 51.4 per cent of the farmers live along improved roads; 83.0 per cent around the Cincinnati area; and 61.6 for Ohio as a whole. In addition many more farms would be added which are 40 or 80 rods from an improved road. The same Census reports for the east north central states (Wisconsin, Michigan, Illinois, and Ohio) 46.8 per cent of the farms along improved roads plus 17.9 per cent more along improved dirt roads, and for the west north central states (Minnesota, Iowa, Missouri North Dakota, Kansas, Nebraska, and South Dakota) 11.7 per cent of the farms along improved roads plus 44.5 per cent more along improved dirt roads. Improved roads permit trucks to travel in nearly all kinds of weather from the farm to points of destination. It is, of course, obvious that trucks have great difficulty traveling over earth roads except during the favorable periods of the year. The good road development has no doubt been an important factor in favoring the movement of livestock by truck.

In discussing this question let us next consider the reasons given by a group of livestock producers favoring the truck. Some five hundred livestock farmers in southwestern Ohio in a recent study were asked why they trucked their livestock. Slightly more than one third said it was quicker; one tenth stated it was more convenient; one fifth thought they had less shrink; another one tenth believed it was cheaper; and the balance gave other varied reasons or had no reasons at all.

Quickness and convenience taken together were the most important reasons. No doubt these are factors that have weighed heavily with the farmer. If the farmer lives within trucking distance of a terminal market, he can call a trucker and his worries about marketing are largely over. The trucker comes to the farm, loads the livestock, and takes it to the market. All the farmer does is to decide the day when he wants to sell his livestock and the trucker does the rest. It is convenient and quick. Farmers like that service. They have the same convenient service if outside the range of the terminal market. The principal difference

[2] Improved highways are understood to mean those other than earth, such as gravel, stone, etc., as well as paved roads.

being that they must deliver the livestock on the day when the cooperative association is loading or on the day selected for delivery when sold to a private purchaser—that is, a private dealer, trader, concentration yard, or slaughterer. Then too, it must be remembered that many private purchasers accept livestock any day. So the farmer has nearly the same convenient service whether marketing to a terminal market or elsewhere.

This whole question of quickness and convenience is an important factor. If the livestock market looks good to the farmer, the truck is at his command. Today communication and market information are vastly improved from what they were ten years ago. Many radio stations broadcast the livestock markets several times during the day, giving to the livestock farmer the markets on the opening, at noon, and at the close, with some indication at times of the prospects for the market the next day. Market information by radio permits the livestock farmer to be better informed today than the private buyer was ten years ago. Consequently, many farmers decide to market their livestock on very short notice. If he decides to sell suddenly, for any number of reasons he can do so. This is especially true when in trucking distance of the terminal market. It is also important when out of range of a terminal. If the near-by cooperative or private purchaser is unable to handle his livestock the farmer can call up the marketing agency at the town beyond his customary point of marketing. A few miles more adds little to the cost if quickness of selling is important. It doesn't take long to go 25 miles. Thus, the farmer has greater flexibility in his marketing system with the truck at his command. This factor of flexibility is very important for it has an important bearing on our livestock marketing system.

Some think that trucked livestock has much lower shrinkage and many farmers are so convinced, but from the scant information on this subject, shrinkage would appear to vary little whether livestock was trucked or delivered in some other manner. Some studies would seem to indicate shrinkage to be slightly lighter for trucked livestock, but it would seem that the time element is the important factor.

In addition to the factors so far mentioned, the intangible advantages have weighed heavily in influencing the farmer to use the motor truck more and more. During the busy season the livestock producer can call a truck, market his livestock, and no time need be lost from the preparing, planting, cultivating,

or harvesting operations on the farm. Then too, the fact that by calling a truck the farmer need not worry about handling an unruly bull, or a "fence busting" stag, for that job falls to the trucker. These are advantages of the trucking system. The livestock trucker is ready to go at the command of the telephone. The farmer does not have to worry concerning livestock racks or the difficulty of driving livestock on our present highways with the ever-increasing motor travel. Nor does he need to concern himself with loading chutes, for truckers carry collapsible chutes on the trucks, thus permitting loading at almost any convenient place. The intangible advantages are real although difficult to measure.

The farmers' chief concern is the payment for trucking the livestock—the amount he has to part with for this service. In nearly all instances delivery by truck will cost more than delivery in some other manner. Recent Illinois investigations[3] have shown that within the trucking radius of the three terminal markets Peoria, East St. Louis, and Chicago, the comparable trucking rates averaged from 6 to 25 cents per hundredweight higher than by rail. Within the Cincinnati[4] area the comparable truck rates were found to be very little greater than the rail rates; while in the Cleveland[4] area they averaged from 12 to 25 cents per hundredweight higher than railroad rates.

It must be pointed out that livestock trucked to terminal markets costs more to market than livestock delivered by railroad. For example, the yardage charges were from 40 to 52 per cent higher depending on species, on truck delivered livestock at Cleveland in 1929 and from 17 to 33 per cent higher at Cincinnati for the same period. Likewise the commission charges for selling would average higher because of the greater number of small consignments by truck. When truck consignments include as many animals as a single car of rail-delivered livestock the differences in commission charges are small with few exceptions. This applied to both Cleveland and Cincinnati.

Most of the truck arrivals are small consignments. It was found at Cleveland that 85 per cent of the trucked cattle and 70 per cent of the trucked calves were three or less to the consignment. In other words most of the trucked cattle and calves had to be sold in lots of one, two, or three head. For hogs and sheep the number was larger, as 70 per cent of the hogs and

[3] Illinois Bulletin 342 by R. C. Ashby.
[4] Ohio Agricultural Experiment Station Bulletin 440.

slightly over 40 per cent of the sheep and lambs were in bunches of 15 or less per consignment. Sheep and lambs had the largest number per consignment of all species; around 30 per cent arrived in lots of 25 or more per consignment. It is easily understood why yardage and commission rates should be higher, for more time and effort are required as compared to carload arrivals.

Even though the costs of marketing livestock delivered by truck at terminal markets are somewhat higher than by rail, nevertheless, the volume of truck deliveries continues to grow as previously pointed out. The question of service and the tangible, as well as intangible advantages, have influenced the livestock farmer to this system of transportation.

With this increased volume of livestock moving by truck, it is well to consider those groups which are performing the actual truck operations. In general, there are roughly four classifications. First there is the commercial trucker, who trucks for a definite rate or lump sum. For example, 30c, 40c, or 50c, etc., a loaded mile, or 10c, 25c, or 50c per hundredweight, or 50c or $1.00 per head, or $2.00, $5.00, $10.00, or $25.00 per truck load. In addition, some do not have definite rates, but ask what they think will get the business. This group is supposed to operate under public utility regulation, but in some states there is a growing tendency for more to operate on a flexible basis without regard to public utility regulation.

There is a second group of livestock truckers who are essentially livestock buyers or traders. That is, they take title to the livestock and pay the farmer a definite sum. They are essentially traders, although in many instances they will truck the farmers' livestock when "a deal cannot be made." There is another variation of this last group of truckers in that they buy a definite sum below a certain market. The price to the farmer is not settled until the livestock is sold. From the price received the trucker deducts this definite sum, which usually includes yardage and commission as well as trucking, and pays the balance to the farmer. This is done "to get around" the regulations of the Public Utility Commissions for the livestock is sold as though owned by the trucker. This is a sort of "degenerated cooperative" method.

There is a third group involved in trucking which might be named marketing agencies. These are of two kinds, private and cooperative. To illustrate, a concentration yard may offer a

farmer a price and send the truck to the farm and get the livestock, or a local slaughterer or interior packer may do the same. To be sure, the cost of trucking the livestock enters into the price, but the farmer is offered that service. Some few cooperatives have purchased trucks and are operating them on a definite schedule of rates. Some other cooperatives have contracted with trucking agencies for a definite rate within a specified area. The cooperative makes the same trucking charge to all farmers for the area. Thus, the cooperative stands to suffer the gain or loss, depending whether the shipments are greater or less than the average distance from the shipping point for the area. Within this third group may also be classified those marketing agencies, both private and cooperative, which have definite contracts and agreements with truckers. When a farmer decides to sell his livestock and says "send out a truck," the marketing agency has a truck at its command. Obviously, the trucking charge is deducted from the farmer's check when settlement is made and paid to the trucker. In fact, many truckers depend entirely upon the business furnished them in such a manner by the marketing agencies.

The fourth group of truckers is the farmer himself. More and more farmers each year are purchasing trucks for their farm hauling. By hauling his own produce the farmer is assured that it will be done in a manner suitable to him. He is certain to have the truck at his command when he wants one. Then too, many farmers truck the livestock of their neighbors. In some respects many have gotten over into the class of semi-commercial hauling, but nevertheless, a considerable number of farmers are trucking their own livestock. Most of their hauls are of the short nature near their own communities. Thus we see that livestock is moved from the farms by a number of different groups of truckmen with varied classes of rates.

The question naturally arises how far is this livestock trucked today, how far do the trucks reach out from the markets? At Cleveland it was found in 1928 that of the livestock delivered by truck, 84 per cent of the hogs came from within a zone of 70 miles and 87 per cent of the cattle came from within a zone of 60 miles. At Cincinnati 92 per cent of the hogs and 93 per cent of the cattle arriving by truck were transported in 1928 at a distance of 60 miles or less.

Mr. Ashby found that the bulk of the hogs and cattle trucked in 1927 to Peoria came from a distance of 55 miles and less; at East

St. Louis and Chicago most of the hogs and cattle were trucked from points 65 miles or less, although some livestock, but relatively little, was received from points 100 miles or more distant from these markets.

For the year 1929 at South St. Paul, E. C. Johnson and E. A. Johnson found that 83.6 per cent of all truck loads (cattle, calves, hogs, and sheep) were trucked 60 miles or less, 6.3 per cent from 75 miles or more. Only 1.3 per cent of all truck loads at South St. Paul came from 120 miles or more.

From a recent Indiana study[5] the facts would indicate that the bulk of the livestock arriving by truck at the Indianapolis market came from within 60 miles of that market. At all of these markets (Cleveland, Cincinnati, Indianapolis, Peoria, Chicago, East St. Louis, and South St. Paul) very little livestock at the time of the studies was coming from distances over 85 miles. On the other hand, there was very definitely a tendency for livestock to be trucked farther each year. The St. Paul study showed the average haul for all trucks for 1924 of 22 miles; for 1926, 31.6 miles; for 1928, 35.7 miles, and for 1929, 40.8 miles.

From the little information available on the Missouri River and other western markets it would seem that livestock was trucked greater distances than at the markets recently mentioned. While we hear more of the exceptional long distances livestock has been trucked, these prove the exception and of course are more suitable for publicity purposes.

With this discussion as a background let us consider another phase of trucking, namely, how it is affecting our livestock marketing system. What are some of the changes that are evolving? One of the most significant changes within the past decade has been the decided increase in direct to packer marketing,[6] which is assembling livestock at the point of production and moving it direct to the slaughterer, thus avoiding shipment to the terminal livestock yards. Data published by the United States Department of Agriculture show that direct to packer marketing has increased from 25.6 per cent in 1923 to 40.2 per cent in 1929. The first nine months of 1930 indicate about the same percentage as 1929.

For Iowa, our outstanding hog-producing state, direct marketing of hogs according to Professor Miller, has increased to the

[5] Indiana Bulletin 337.

[6] For those interested in a full discussion of this subject see Paul L. Miller's paper on Trends in Livestock Marketing in the United States, presented at the International Conference of Agricultural Economists at Cornell University, August, 1930.

point where roughly two-thirds were marketed through direct sources and one-third through the terminal market centers.

What has taken place in the country as far as assembly of livestock is concerned? Previous to 1920 the principal agencies for assembling livestock were the private buyer and cooperative shipping association operating within a small area around a local shipping point. The livestock was ordered in to a point of assembly on definite days and was weighed, loaded in cars and started toward its point of destination. To be sure a part was purchased by near-by slaughterers, including the local retail butchers. Today, in addition to the above assembling agencies, we have what might be termed concentration agencies, or, as they are known in certain parts of the corn belt, "concentration yards" or "union stock yards." These are of two types—cooperative and non-cooperative. The non-cooperatives are sometimes operated privately and sometimes by packing interests.

These concentration agencies assemble livestock from a much larger area than was possible with the earlier type of assembling agency. It is common for these agencies to assemble livestock from points ten, fifteen, and twenty or more miles distant. As a result they secure a larger volume of livestock at one point. With the greater volume such agencies have been able to sort hogs into the grades demanded by packers. Thus, they are now performing the function of grading formerly done only at the terminal markets, and consequently are supplying the packers with hogs direct from the country.

Now the truck, in which we are most interested, has been the essential factor, to my way of thinking, in assisting and developing this direct marketing agency. To be sure, there are other factors that have assisted in this development. Some of these may be merely mentioned, such as, changes in the competitive relationships of the packing industry, food habits of the consuming public, the influence of the war period, the rise of local livestock cooperative shipping associations, the rapid increase and broadening of market communication and information, and the growth and development of a large number of interior packers. It is outside the limits of this paper to discuss these other factors, but a very important influence has been the great improvement in motor transportation. The truck permits of a much larger area for concentration with a radius of ten, fifteen, twenty or more miles being the more common. When livestock is once loaded, it takes very little longer and the cost is not much greater

to truck fifteen instead of ten miles, provided the service and price considered are more desired by the farmer at the point fifteen miles away instead of the one ten miles distant. The concentration agency has been permitted to draw livestock from a much wider area by the aid of the truck than without its services. In Iowa, especially, a way was found around this by the re-load stations. Privileges were granted at certain points by the railroads to unload livestock, grade and sort to desired weights and then reload the livestock in double decks and send it on to points designated by the re-load station. This is to livestock in reality what the "milling in transit" privilege is to wheat. However, the truck is assuming a more important part each year even with these re-load agencies.

The truck gives these concentrating agencies a much greater potential volume, for it is essentially a question of net return to the farmer whether he delivers to one agency or another over a fairly long period of time. With the truck it becomes possible for certain agencies to "pull away" part of the volume from other agencies with overlapping territory. Thus, the battle of competition is made keener and keener. For no longer is a livestock marketing agency secure in its own little bailiwick around one shipping point. It may get the most severe kind of competition from another ten, fifteen, twenty or more miles away for the truck gives the livestock producer greater flexibility in his marketing system and a wider number of outlets. Thus it is possible to see where the truck is helping to render some agencies more efficient and enable them to do a better job of marketing, while on the other hand, the truck is a thorn in the side of the less efficient marketing agencies and is making it more difficult for such agencies to perform the services of marketing. This is as it should be. For those who like plenty of competition in the assembling process of marketing the truck is helping to perform its function in a very splendid manner as far as livestock is concerned.

Previously in this paper the growth of trucking in the vicinity of terminal markets has been pointed out. Gradually in these areas the assemblers, cooperative and non-cooperative, have had to give way to the truck. Today, the trucker performs this function, and delivers the livestock from the farm to the terminal market.

At present it still seems hazy as to just how far in the future the truck will continue to eliminate previously established live-

stock buyers and cooperative shipping associations. It is certain that in the outer zones of this truck territory the truck is going to be utilized to the benefit of the local assembler of livestock. Some groups are already using the truck in a combined manner. In Crawford County an Ohio cooperative association illustrates this point.

This county is located approximately 100 miles from Cleveland. This cooperative association has witnessed the trucking zone spreading farther each year. By 1930 it had reached that part of the county nearest to Cleveland. The association proper was operating principally in that portion of the county most distant from Cleveland. The directors of the cooperative, with the help of the state association, were cognizant of the successful truck operations of several cooperatives nearer to the Cleveland market. The management became so convinced that the cooperative purchased a three-ton truck and commenced in April, 1930, to offer its patrons the additional service of this truck. While the period of operation only covers a period of nine months, this business venture of the Crawford cooperative has proven so far very successful. During this experiment the operations are studied carefully, and the expenses are analyzed so that authentic information will be available to other cooperatives located in similar competitive situations. It would seem that such procedure would warrant careful investigation by other groups located within or near the expanding truck areas of terminal markets.

The truck has had another very fundamental influence, namely, in the distribution system of the interior packers, especially the smaller establishments. Without the truck, the small packers had difficulty in distributing their meat products to the retail trade. The national packers, with their well-established car routes and their distributing agencies located in the principal strategic cities, were able to offer a service which the small interior slaughterers were unable to meet. But with the coming of the truck and improved roads, the competitive advantage has changed. The smaller killer, killing 3,000 or more hogs annually or the equivalent, with the aid of the truck is now able to offer at times a superior service to the retailers he serves. Especially is this the case in the eastern part of the corn belt.

These small killers in many instances have been interested in purchasing livestock near by. They have depended upon direct purchasing in a large degree, and have been real factors in the livestock marketing system within the logical trucking area of

their plants. At times they have been very good outlets for the livestock farmer and other times very poor. The truck has given to them a virility that has caused considerable annoyance to existing marketing agencies. This has not been the case when working relationships have been established with these smaller slaughterers.

When the existing marketing agencies establish working agreements with these small killers, the truck is often depended upon to move the livestock from the point of assembly to the slaughterer. Some truckers are transporting such livestock for railroad rates. Whether this can continue only time will tell. However, more marketing agencies, cooperative and non-cooperative, are making arrangements with the smaller slaughterers to supply them their livestock.

The truck is having another influence upon the livestock marketing system, with particular interest to cooperatives, which should be mentioned. The trucker many times influences the farmer to consign his livestock to definite commission firms. In fact, in practice many truckers have turned out to be in reality solicitors for commission agencies. It would seem that it would make little difference to the trucker whether the livestock went to one commission firm or another, but for some reason or other some of these truckers have become very ardent supporters (really solicitors) for particular firms. One of course can very easily guess the answer. Just the other day a trucker called at the office of one of the cooperative commission associations and wanted to know how much the cooperative was going to pay him for trucking livestock to them. The trucker stated he controlled 90 per cent of the livestock in his community and would influence its movements to the commission firm he selected, indicating of course the one making it most worth while from the standpoint of remuneration. To be sure, not all truckers are of this type, but nevertheless the trucker has the contact with the farmer. This fact alone is important. The truck has in reality eliminated the producer from personal contact with his marketing agency and instead the trucker assumes that position. Hence, an important educational avenue is lost. When a livestock farmer can see his hogs weighed and graded and handled he is in a better position to market his product. Misunderstandings are less frequent, but with the coming of the truck much of this personal contact is lost. Some cooperative commission associations have had to face this problem of personal contact of the trucker. Others are meeting it

now. Nevertheless, the trucker has the contact with the farmer and is a real factor in the situation.

As a result of trucking, our livestock marketing system at points of assembly seems to be moving in a definite tendency toward larger units, for both cooperative and non-cooperative agencies. To anyone familiar with livestock marketing this is general observation. This point can be illustrated by the situation in Ohio. In 1920 there were approximately five of the larger type concentrating or assemblying agencies (all of these were non-cooperative) in addition to the two terminal markets—Cleveland and Cincinnati; but today there are twenty-six non-cooperative and ten cooperative concentrating agencies. Other states would probably show similar situations.

As trucking becomes more established and farmers become more accustomed to transporting their livestock greater distances, points of assembly will grow for the management seems to be able to do a better job of marketing. They can sort and grade nearer to the demands of the packer, sell more nearly what is wanted and make the purchaser better satisfied.

If this tendency continues, and there is very little reason to think otherwise, then the next step may bring more integration, consolidation, and chain or supervised management. There is very tangible evidence of this at present. Some of our cooperative leaders are considering this very step in the light of present-day developments. Thus we may see area marketing agencies including one or more counties supervised and managed in a more effective manner. In order to obtain more standardized practices and methods, which seem essential for future development, the managerial factor will have to be raised. This applies to cooperatives in particular.

Such area marketing agencies will permit of higher type management. It will make it possible to train and develop younger men, who will be able to move up and perform more responsible duties as opportunity permits. This last point has been a very weak link in the cooperative system.

Very serious thought is being given at present to this whole question of area marketing, with all its interrelated problems. There are many angles of this problem of area marketing that could be discussed, but in this paper we merely wanted to point out this newer development in the livestock field. Whether it will expand and develop will depend largely upon the success it meets in the initial attempts. Motor transportation is aiding and assist-

ing these newer developments, and will give flexibility to the system as it develops.

From all data secured so far there is little evidence indicating that the trucking territory has reached its outer limits of the terminal markets, although there are indications that the truck territory is commencing to reach its maximum limits. As the truck area expands and the shift in the truck area from railroad to truck is completed more and more of our major terminal markets will depend primarily on truck receipts.

Within the next few years we will probably see more of the larger trucks carrying the equivalent or more of a single-deck railroad car. Some of these trucks are operating now. If it can be demonstrated that these mammoth trucks can be operated at not too great an increase over railroad rates, there are numerous truckmen ready to jump into this field. Such trucks can give overnight service to the market and more frequent service than is possible by railroads. Now many livestock marketing agencies are not able to load livestock one day and sell on the next day's market but must wait to the second day, due to the railroad schedules. This territory would swing quickly to the truck provided the truck rates could be maintained in a comparable relationship to railroad rates.

No effort has been made in this paper to discuss the questions of truck operations, trucking rates, or the problem of public utility regulation and control. While these questions are important, it was felt that other phases of the problem should be presented at this time.

In conclusion, then, here is a force vitally affecting our livestock marketing system, making it completely over here and modifying it elsewhere. It would seem that the sensible thing for those interested in marketing livestock is to aid, regulate, and influence this economic force rather than to oppose it; to study it, analyze it, see where it can aid and thus utilize it for the greatest economic benefit.

CHANGES IN TRANSPORTATION AND AGRICULTURE[1]

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It is a favorite pastime, particularly among speakers who seek to make a favorable impression upon the farmer by their oratorical efforts, to proclaim that agriculture is the basic industry on which everyone depends. No one will quarrel with the idea that we must have food. However, it does not take extended reflection to arrive at the conclusion that our economic organization is not truly portrayed if it is pictured as resting on a single pedestal. While farming is one support, there are others that are essential and transportation certainly is one of these. Under our present development of agriculture, market organization, and population centers, the consumer commonly is found at a considerable distance from the point of production and the raising of the products on the farm would be largely wasted effort were it not for transportation facilities which can transfer them to the consumer.

It is because of this fundamental importance of transportation to agriculture that any change in the methods, facilities, or costs of carrying farm commodities, produces very definite influences upon the industry. These changes often upset the relationships previously existing among competing areas with the consequence that their effects may be felt far from the areas where they take place. The development of this country furnishes illustrations of this fact. The initial settlements naturally took place in areas near the coast or accessible to the coast by natural waterways. While intrepid pioneers invaded the interior to a surprising extent, settlement of distant areas awaited transportation progress. For a long time, interest in transportation centered about waterways and highways. During those days livestock was driven overland long distances to market. Real agricultural settlement of the Middle West, however, followed in the wake of railroad building. The extension of railroads into the virgin prairies of the interior and the expansion in agricultural production created new and strenuous competition for farming areas in the East.

An excellent illustration of a transportation development of far reaching effects upon farming is supplied by the refrigerator car. The earliest attempts at rail shipments in freight cars with special refrigeration protection came only some sixty years ago.

[1] Paper read at the twenty-first annual meeting of the American Farm Economic Association, Cleveland, Ohio, December, 1930. Paper No. 993 of the Journal Series of the Minnesota Agricultural Experiment Station.

These attempts naturally were crude but the progression of improvement has produced the present highly developed refrigerator car. This equipment is such an integral part of our present transportation facilities that it is difficult for us to picture its full significance in the distribution of farm products. It is at the basis of our present national distribution machinery for meats. Prior to refrigeration in transit, the slaughter of livestock had to take place near consuming areas. Important markets had been established at various eastern points to which live animals were carried by rail. The refrigerator car made it possible to establish large packing centers nearer the sources of livestock and consequently effected a vast change in the market organization for livestock.

Due to the bulkiness of the product, its perishability and the importance of sanitary precautions, metropolitan areas have continued to draw their supplies of fluid milk primarily from near-by areas. Location of consuming centers, therefore, has remained the determining factor in localization of market milk production. The same would have been true of highly perishable fruits and vegetables had it not been for the development of refrigeration service. This transportation service has enabled areas located at a distance from market centers to make use of natural advantages which they possess for the growing of perishables. California, Florida, Texas, and other areas are representative of this. While local truck gardening has continued to be of importance around cities, the local products are supplemented by products from a distance. The effect has been two-fold. The shipping in of products from distant producing areas tends to restrict outlets for competing home-grown products on the one hand, but the presence of the shipped-in goods also has lengthened the season of availability and has been a factor in increasing the consumption of perishables.

While metropolitan milk supplies continue to come from the near-by milkshed, shipments of perishable dairy products may take place for long distances. Thus, sweet cream from the Middle West is being brought into the southern and eastern markets to supplement the local supply. Speedy transportation and adequate refrigeration service have made this possible and have made it worth while for some midwestern marketing units to equip themselves so as to be in a positon to cater to this outlet.

Proper transportation facilities have permitted butter production to be developed most extensively in the areas having advan-

tages for the production of dairy products and as a consequence we find Minnesota, Wisconsin, and Iowa in the front ranks in the butter industry. The development of the production of eggs on the Pacific Coast for sale in New York and other eastern markets is another illustration of how transportation may affect the type of production of a given area.

We see these things and take them largely for granted. Changes in transportation take place before our very eyes in such a way that the full import of these changes fails to impress itself upon us. It is only when we look back and try to create a picture of how different our agriculture might have been without certain transportation changes, that we gain an appreciation of their true significance.

Nor are these matters of mere historical interest. New developments constantly take place. New facilities are supplied; rate structures change; competitive relationships of producing areas are changed. The automobile is a case in point. The indirect effects of the automobile have been great. Motor propelled vehicles have largely replaced horse-drawn ones with the consequence that the horse population dependent upon the farms for its feed requirements has dropped decidedly. In addition, the motor truck itself has had some very direct influences on the marketing of farm products. The number of motor trucks has increased at a rapid rate. Thus, there were slightly over one million trucks registered in 1920; in 1925, there were nearly 2½ million and by the end of 1929, there were over 3⅓ million trucks registered.[2] Figures are not available to show how many of these trucks are employed primarily in carrying agricultural products but it is evident that such use is a significant part of the total.

Motor trucks have had a marked influence on the methods of handling and marketing livestock, particularly in areas adjacent to market centers. Mere passing mention will be made of this because it will be considered in detail by the next paper. The percentage of stock arriving by truck has been mounting steadily with the increase in the number of trucks and the improvement of roads. Some markets are now receiving a large share of their stock by truck. The effects of the change have been felt especially by marketing agencies. Cooperative shipping associations in many localities within the trucking area have dropped out of the picture because of truck shipping. Changes in handling facilities at the receiving yards have had to be made. The position

[2] Monthly Letter to Animal Husbandmen, Vol. 11, No. 8, Armour's Livestock Bureau.

of many farmers with respect to the market has been changed because the truck makes it possible for his stock to reach the central market more quickly and consequently short-time fluctuations in prices and market conditions have acquired greater significance for him.

The combine is frequently said to explain the more rapid flow of grain to market during the harvest season occurring in recent years. Undoubtedly the combine and the tractor are important influences in the extension of wheat growing to newer areas of the West. Sight must not be lost, however, of the fact that the motor truck has played a part both in speeding up deliveries and in making it possible to extend farming operations to regions a considerable distance away from railroad shipping points.

The coming of the motor truck has had and is having considerable influence on fruit and vegetable markets. For one thing, the motor truck has widened greatly the area from which local truck crops may come into a city market in less than carload lots. The location advantage of near-by producers has been lessened somewhat. General farmers located beyond the area ordinarily devoted to truck crops may decide it worth while to grow certain vegetables as a side line with the intention of delivering them to the city market. Market gardeners look upon such motor truck shipments from outside areas as a source of market disturbance. Attractive prices may draw in supplies in such amount that a highly satisfactory market may be turned into a slow, draggy one on which it is difficult to sell at any price. Sacrifice selling under such circumstances naturally is a more serious matter for the gardener who places primary dependence on the market than for the man who merely happens to be there incidentally with a side line product. Complaint is also heard that the man from a distance who is only an occasional visitor on the market usually is not so well posted on market values and may start a break by cutting prices.

Complaint of another kind occasionally arises with respect to the effect of the motor truck on market outlets. The truck has made it possible for the wholesale produce dealer at a central point to establish constant contact with retail outlets over a considerable territory. Some local growers say that the products brought in at times interfere with the local sale of home-grown produce.

The increase in the number of motor trucks in agricultural areas and the improvement of highways affect local markets and

market agencies in other ways. Cooperative creameries in Minnesota and adjacent states supply an illustration of one type of such effect. Local creameries were located during the days of dirt roads and horse-drawn vehicles. Changes in transportation facilities have enlarged the areas accessible to a local creamery and this has tended to intensify competition among such units. The time would seem to be at hand for giving serious consideration to the possibilities of effecting consolidations which would eliminate unnecessary duplication.

The automobile and motor truck likewise have enlarged the areas within easy reach of market centers. This factor seemingly is at work in creating new alignments among rural trade centers. The effect probably is to increase the trade in some lines for certain more enterprising or better located centers at the expense of other centers.

Another change in transportation is that involved in various proposals for the development of inland water routes to serve the great agricultural interior of the country. Agricultural products are held up as important suppliers of tonnage for the proposed Great Lakes-St. Lawrence waterway. Until this project acquires more definite form it is impossible to make much progress in analyzing its agricultural consequences. The same is true of other proposed improvements to internal waterways. Ardent proponents of such developments find it easy to paint rosy pictures of how they will swell the coffers of agriculture. Opponents in turn employ counter arguments to demonstrate that the claimed advantages are mirages.

These projects are of importance to the farmer to the extent that they may increase his prices by reducing his transportation costs or by providing more near-by outlets. A recent book[3] states that " 'who pays the freight' is a favorite subject of discussion among economic theorists." I have not observed any particular disagreement among economists over the generalization that transportation charges in the long run are included in the costs which the consumer must pay if the needed supply is to be forthcoming. Persons outside of the field of economics frequently are not able to follow the economist through the ramifications which lead to the doctrine that the "consumer pays the freight." The farmer, particularly, is apt to conclude that he pays the freight on his products going out and in turn on his supplies coming in. The difficulty arises over a failure to dis-

[3] Stokdyk and West, The Farm Board, p. 18.

tinguish between what may be true at a given time and what tends to be the case in the long run. The economist, of course, does not mean to imply that a sudden increase in transportation costs will be transferred instantly in its entirety to the consumer. Transportation charges like other costs must be covered for the supply required by the market or else that supply will not be forthcoming permanently and the shortage will cause price to move to the point where these charges will be covered. That is, the relation of transportation charges to prices operates through supply and demand relationships. The nature of the agricultural industry is such that rapid adjustment of supply is not made, consequently it may take the industry a considerable period of time to adjust itself to changed transportation situations.

It is well to bear in mind that the effect of transportation changes either in method or in rates, is not uniform for all farmers. The location value of a farm near market tends to be enhanced by an increase in transportation rates because it weighs more heavily on distant producers. The effects on rents and land values may be far reaching before the final adjustments are worked out.

The preceding brief reference to the relationships between transportation and agriculture may suggest some research problems which agricultural economists have not been able to attack in sufficient detail up to the present time. If transportation changes affect the competitive relationship of various agricultural areas then it is important to know more of what their effects really are and how they function in order that the farming industry may take it into adequate consideration in formulating desirable programs of action. Attempts to measure the influence of transportation upon shifts in agriculture would seem highly worth while. Freight rates necessarily are to a considerable degree the consequence of compromise. Cost of rendering service is not determinable with any degree of accuracy for individual items nor is it any more satisfactory as a single basis of rates than the benefit principle is suitable as the single guide in the levying of taxes. The value of the service or what the traffic will bear enters into freight rates that may be charged as well as the ability to pay enters into our tax system. There is need for more information as to the consequences likely to follow certain rate changes. The relationships between commodity prices and transportation rates also need to be considered carefully.

There is a place for studies of the effect of transportation

changes upon costs and methods of marketing. New alignments of marketing units may need to be arrived at in some areas because of changes in transportation methods. Research studies should be helpful in pointing the way for needed adjustments.

Railroads being in the class of natural monopolies, rates are subject to regulation by public commissions. The problem of rate regulation consequently is one involving public policy. The establishment of existing rate structures has created certain relationships among areas and trade centers. These rate structures have come into being over a period of time and often include a variety of compromises and yielding to local pressure. Economic activity having been allowed to become founded upon that structure, the tendency is to seek to maintain the *status quo* rather than to make changes which might produce extensive realignments in our economic life. The short-run viewpoint tends to be one of seeking to avoid unnecessary disturbance of competitive arrangements among areas. From a long-time viewpoint, a variation from this policy might be found to appear preferable in some instances.

For example, in the case of agricultural products, if it were decided that public interests would be served best by making wide areas available to markets, a policy of low rates on farm products would be followed. Under such a policy the farms nearer market centers would not have as much of a location advantage over the more distant areas and there would be less distinction in rents and land values than with high rates. If it were decided that farm products should be produced as near to market as possible, rates on agricultural products would be made relatively high. The farms near market would have a high location advantage which would be reflected in the rents and prices which would prevail for such land.

More consideration might well be given to studying the policy which should be followed. The solution of this problem is far from simple and the lack of satisfactory quantitative measurement of some of the factors involved probably will make it impossible to formulate a clear-cut, long-time policy. A difficulty of another sort is that we cannot forsee future changes that will take place. For example, some years ago it was the popular belief that the lands in the timber belts of the Lake States were destined to blossom into profitable farms as soon as the timber could be removed. Now we see much more clearly that there are vast areas which are not needed at present or for a long time in the future for agricultural purposes. Another illustration of

an opposite character may be found in case of the great plains area. Lands which for a long time were classed as submarginal for wheat production because of lack of moisture have come into the extramarginal class due to the fact that the tractor and the combine have made extensive farming of these areas feasible.

The employment of public control over transportation rates to put into force a definite policy of agricultural production, of course, would encounter difficulties other than those due to the lack of ability to measure the effects of changes and to foresee future conditions. Important among these would be efforts put forth by localities to have the policy overthrown where they felt that their areas were being held back from developing in a manner possible under a rate structure more liberal to them.

The purpose of mentioning this at all in this paper is merely that it may serve as another reminder of the important rôle played by transportation in agriculture. There would seem ample room for some comprehensive research studies of various aspects of this problem. Many of these studies can be carried on to best advantage by agencies which are not restricted too greatly by the existence of state boundaries.

THE SIGNIFICANCE OF TRANSPORTATION RATE POLICIES IN THE MARKETING PROBLEM[1]

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The significance of transportation rate policies in the farmer's problem of marketing his products has usually been thought of in terms of the amounts paid for transportation as compared with the amounts paid by the consumer for the product or the amounts received by farmers for it.

Considered without analysis of the relationship of the particular area to other areas producing the same products, and of the shares of the various products in paying the whole necessary cost of maintaining the carriers, this sort of consideration has relatively little meaning. The spending of a larger proportion of the gross return as freight charges simply means that it is cheaper to reach out farther and haul the products a longer distance than it is to produce more of the product by more intensive applications of labor and capital in the near-by areas. Because of this, we could expect, as our productive operations became more highly specialized, a somewhat higher proportion of the gross return to be spent for freight charges (assuming no change in the efficiency of carriers).

The total amounts going to carriers as related to their total expenses and the relative portions of these amounts assessed against given farm products as compared to those charged on other commodities do present some complex problems of distribution of wealth, and incidence of charges too lengthy to enter into in the short space of this paper. The relationship between price of the product and the payment for transportation does, however, have one important bearing on marketing problems which should be mentioned, though it cannot be developed. Since transportation charges are relatively stable as compared to commodity prices, these, like other semi-fixed charges, are a larger percentage of low prices than of high prices, and the larger the gross charges of this type, the larger will be the percentage fluctuations in the net price to the farmer with given changes in the prices at the central markets. Because of this, those areas which require a large freight charge to reach their markets are subject to larger percentage variations in the prices paid to farmers, a fact which complicates the marketing and farm management

[1] Paper read at the twenty-first annual meeting of the American Farm Economic Association, at Cleveland, Ohio, December, 1930.

problems of these outlying areas in many ways. A similar larger percentage and also a larger total effect on these areas is involved whenever general percentage increases or decreases in rates are applied.

Possibly more fundamental though less evident and slower in their action are those aspects of rate policy which have to do with market structure; that is, which determine where products will be assembled and processed, how large the various market centers will be, what producing areas will supply given consuming groups, etc.

Without attempting an appraisal of the relative importance of these different aspects of the subject, the present paper will, for brevity, be confined largely to the last mentioned phase.

In spite of the fact that numerous thousands of pages of testimony before the Interstate Commission are filled with opinions, contentions, and data relative to inter-market relationships, direct consideration of the space relationships of the market area in any fundamental sense is almost negligible. A few incidental comments by Alfred Marshal, the suggestive note by Professor Fetter in the Quarterly Journal of Economics, the important contributions of Von Thünen and Alfred Weber, and some references to the subject by J. B. and J. M. Clark practically comprise the treatment of the subject in economic theory though many studies and discussions bear on it incidentally.[2]

In general, our marketing studies up to the present time have been largely concerned with describing the more obvious features of the marketing machinery and of marketing relationships. Granting that an accurate description is a first necessity in any approach to these problems, future researches must, if we are really to understand the relationships and deal with them intelligently, seek to analyze them in terms of cause and effect, and to estimate more definitely the magnitudes and limitations of changes resulting from adjustments made in given directions, what sorts of planned activities result in such changes, etc.

Economic location is determined not by distance but by costs in terms of cash payments, time required for shipment, deterioration of the product en route, etc., and is, of course, affected by rates charged for trucking or other means of transport as well as by those charged for rail hauls. However, since two of the preceding papers have dealt with various phases of the trucking

[2] Fetter F. A., The Economic Law of Market Areas, Quarterly Journal of Economics, May, 1924; J. B. and J. M. Clark, Control of Trusts, 1912 edit., pp. 104-112; Von Thünen, Der Isolirte Staat, Ch. I; Weber, Alfred, Theory of the Location of Industries.

situation, this discussion will be confined to railroad rates as a factor in the problem, though with recognition that alternative methods of transport may modify the relationships established by the rates charged by railroads.

The pricing process for the services provided by railroads is more or less peculiar to agencies of this type. Because of the large percentage of fixed capital involved, and the ineffectiveness of pricing through competition, the determination of charges for these services has of necessity been largely taken over by the state and national governments.[3] This situation necessitates more or less arbitrary determination of area and market relationships which gives special significance to a careful analysis of the implications of various rate policies.

In considering the problems of transportation in relation to marketing, we can make two major subdivisions of the marketing field which seem to require for their study rather different methods of attack. One of these relates to the physical aspects of the movement of goods together with the economics of the combination of physical factors and management for the most efficient performance of these functions. The other major subdivision has to do with the problems of change in ownership, in other words with bargaining, with price relationships, and with distribution in the economic sense.

Two viewpoints may also be distinguished in the attack on these problems, one, that of the social group as a whole, the other that of the individual entrepreneur. From the first viewpoint these problems would be approached with a view to determining how labor, land, capital, and management might be applied in the performance of the marketing functions that society finds it expedient to carry on, at the least expenditure in terms of real costs in the Marshalian sense. We have, of course, no satisfactory measure of these costs except as they may be roughly approximated over a period of time in the pricing process and qualitatively analyzed by more or less deductive methods. Nevertheless, in view of the growing interest in the regulation of marketing activities and the greater scope afforded by the increasing complexity of market operations for anti-social activities by market agencies, for maladjustments in market machinery, for demagogic propaganda, etc., the market research agencies must give more and more attention to the social aspects of the marketing

[3] For further discussion of this aspect of the matter, see Ripley, W. Z., Railroads—Rates and Regulation, Chapters II, III, and IV, and other standard texts on transportation.

problems, and must attempt to see more clearly wherein the private and social viewpoints agree and wherein they diverge. Both the private and social viewpoints must be considered in analyzing the significance of transportation in marketing, and neither can be very fully developed in so brief a space as that of this paper.

Considering the transportation problem from the viewpoint of society as a whole, we should seek to secure the whole product of agriculture by such a structure of rates as would equalize the real costs of hauling commodities from more distant areas with the real costs of producing additional supplies in the areas already under cultivation. Thus the routing, provision of terminals, etc., would be in accordance with the most effective use of the economic resources available. Such a standard, if possible of application, would probably eliminate many of the roundabout hauls now made and much of the duplication of facilities, and would provide for a relationship between market centers and between local shipping points and market centers which would make possible the balancing of certain increasing costs of bringing products to larger-scale concentration points with the economies resulting from such larger-scale operations.

While such a point of view should be and probably is in the background of Interstate Commerce Commission policy, it is greatly modified by the results of historical development which include fixed investments made on the basis of given rate relationships, duplicated facilities, the idiosyncrasies of roundabout hauls, etc. Not only do these elements, which may be largely summed up in the term "precedent," greatly affect the situation, but the rivalries of market centers and carriers of varying political and economic strengths have also distorted the rate relationships of the market area.

The effect of such historical developments is well illustrated in the rate situation under which corn has been moving from the corn belt to the north Pacific Coast markets, Seattle, Tacoma, and Portland. The rate relationships (recent level 59 cents per cwt.) applying from Omaha, Nebraska, Sioux City, Iowa, and Minneapolis, Minnesota, were established many years ago when little surplus corn was available which would not in the natural course of events move through some one of these markets in going to the Northwest. As corn production developed to the west of them, back shipment was allowed through these centers and to the coast markets on the same rate—59 cents from the point of origin. This extended as far west as two hundred to two hundred-

fifty miles making the rate to the north coast the same if corn was shipped from Huron, South Dakota, through Aberdeen, or shipped from Huron back to Sioux City, Iowa, or Minneapolis, Minnesota, and thence west to the coast, a distance of 400 to 500 miles farther. As southeastern South Dakota became a heavy seller of corn, such smaller towns as Huron and Aberdeen wished to handle this forwarding business, but were unable to compete with the more elaborate and highly developed marketing agencies at Minneapolis and Sioux City, largely because of the organized selling representation which these larger marketing agencies could maintain at the western centers. Neither could these smaller forwarding points develop until they could attain some volume of business which would make possible the organization of a general forwarding business and adequate representation in the western cities.[4]

This case is cited, not as an argument that readjustments should or should not be made in the given case, but to illustrate how the reasonableness of a given rate situation may be changed by new developments as to relative production in different areas. This does, however, illustrate strikingly how the marketing organization of an area may be modified by transportation rates. Naturally, the three large market centers, Minneapolis, Sioux City, and Omaha, opposed any change in this relationship with all the weight of their prestige, financial resources, experienced and highly paid representation, etc., basing their argument on the contention that these market centers provide services of such a superior nature in the handling of grain that the producers' interests are best served by an adjustment which causes this grain to move back in a four-hundred-mile out-of-line haul and makes its price base mainly on the outlet to the East instead of the small outlet to the West to which its production location would seem to entitle it.

It is here that our knowledge of facts ceases. No adequate testimony was presented, and no studies have been made to show how large a given market center should be to provide for different degrees of efficiency in performing the various market functions. Shall a policy be adopted of developing numerous medium-sized market centers somewhat along the lines Texas has attempted for wholesale distributing centers or shall the policy look to giving certain centers rate advantages in the form

[4] See testimony exhibits, and discussion in I. C. C. Docket 17000, Rate Structure Investigation, Part VII, Grain and Grain Products within Western District and for Export.

of transit privileges, proportional rates, and joint through rates, which will cause operations in these markets to be on a very large scale? What is the nature of the curve of decreasing cost with larger-scale operations for each market function under these various conditions? No one knows. Yet the question has arisen at each step of the westward movement of the market centers for agricultural products. The chief center of livestock marketing was once at Brighton, Massachusetts, later at Albany, then at Buffalo, then at Cincinnati, then at Chicago, and later large packing centers have developed at Omaha, Sioux City, South St. Paul, Denver, and other western points, each time in the face of violent opposition from the older established centers. What has been the effect of their development upon agricultural welfare? What would have been the effect if their development had been inhibited through rate adjustments? What will be the effect of permitting or not permitting other small market centers to develop? The problem is presented in many forms. How does the granting of a special concentration rate for hogs which permits of buying at unorganized markets affect the market structure of the area, the pricing or bargaining process, etc? It would be interesting to follow these lines of inquiry farther, but would carry us beyond the scope of this paper. The processing of such products as livestock, wheat, or flax can be placed in the East or in the West by comparatively small adjustments of the relative rates on the finished and unfinished products. How will it affect the farmer's situation and the cost to society if the one or the other policy is pursued? In recent years the bitter fight between the Minneapolis and Buffalo milling industries is a case in point, that between the West Virginia and the Pennsylvania coal fields another. A similar problem exists in the location of manufacturing and distributing plants and agencies. It is to a considerable extent a question of relative rates on raw and finished products, of relative rates on carload and l.c.l, of commodity rates, etc.

It may be argued that in such cases as that of the north Pacific coast trade, mentioned above, the larger centers will not be able to hold the business as against the smaller centers unless they do provide superior economies. This, however, largely ignores the differences due to stage of development and to the many special advantages a large center is able to secure by coercion of carriers, superior representation, etc. In nearly all rate matters market centers are greatly over-represented in proportion to shippers and carriers.

The market functionary is not concerned about real costs or the social viewpoint. He is concerned with profits. If he can, by argument, political pressure, or otherwise, bring about given rate relationships which are favorable to him, he will do so. This may result as well from raising rates to a competitor as from lowering his own rates. This latter procedure is especially common among market centers, but, even for producers, a disadvantage to a competing area may be an advantage to another area.

Interpretation of these relationships will require much more adequate analysis than we now have of the relative economies of larger and smaller units; of the functions performed, where they can be carried on most economically, what specialization should occur, what complementary and supplementary relationships are involved for each function in each stage of marketing, and the effects of these upon the costs of performing the various marketing services.

The problems indicated above have to do mainly with the physical movement of goods. In the other major subdivision of the field of marketing we have to do with the relationships of demand and supply to price, with the effect of variations in prices and of shifts in the supply and demand schedules upon the returns and costs to farmers, handlers and other similar functionaries, carriers, and consumers. Here must be considered not only the conditions governing the general location of the equilibrium price but also that variety of temporary and largely psychological relations which at any given time fix the price within the penumbra described by Professor Taussig.[5] In this last we have almost an untouched realm of marketing research, one which has been much discussed but about which we know very little; that is, of the possible range of effectiveness of good or poor bargaining ability, how these manifest themselves, their relations to large or small holdings in given hands, to the number of bargainers, etc. Possibly a backward look at the activities of the Farm Board will presently afford a rich field for investigations along these lines.

In this division of the marketing field problems of transportation rate policy bring us directly into contact with such questions as the following; to what extent do monopoly elements enter into the making of prices in any given market center; in other words, how many market centers need to be equalized as outlets for the

[5] Taussig, F. W., Is Market Price Determinate? Quarterly Journal of Economics, May, 1921.

products of a given producing area in order to insure unrestricted bargaining; what are the effects of altering the rate relationships of given market centers once they have been established; how do these various market centers behave when the relative productions of different producing areas are altered by weather or other factors, etc.?

There is, in fact, much to indicate that the field of agricultural marketing offers more opportunities than any other phase of marketing for important contributions both in connection with the very important and perplexing practical problems now confronting the agricultural industry and in connection with the fundamentals of economic theory. Economic theory grew up largely, and rightly so, in terms of an assumed free competition, a condition which no doubt described more truly the conditions from which the classicals drew their observations than is the case for conditions surrounding us at the present time. Nevertheless, it would appear that those degrees of monopoly activity which do exist can best be understood and measured by reference to a theoretical condition of free and unhampered competition. The production and marketing processes for many of the agricultural commodities seem to provide a nearer approach to conditions of free competition than do those of most of the other industries of the present day. Not only do these products appear to provide a more recognizable "normal" situation; but the demand schedules for many of them appear to be more stable in location and shape than those for most non-agricultural products; and the production situations which give rise to conditions of decreasing cost tend, because of the large number of freely competing units, to run their full course, destructive as this may be to agricultural welfare in terms of total incomes.

Other important aspects of the problem which cannot, because of lack of space, be developed here are:

1. The alteration of area relationships resulting from rate changes and the consequent effect upon prices both in the different producing areas and for the market area as a whole.

2. The total charges made for the general service of transporting goods and the relative charges on the various products hauled.

3. The problems of quality of service, as manifested in the promptness of furnishing of equipment, the quality of equipment, and the speed of service.

4. The problems of terminal facilities, services, and coordina-

tion which are really a combination of market organization and of No. 3 above.

5. A great variety of problems of technique, problems of incidence, problems of relative prices, etc.

It will be seen that aside from the special features of large and sudden rate changes the transportation policies and charges have their principal significance for agricultural marketing in their effects upon the market structure and on inter-area relationships. This discussion has done little except to consider the general setting of the problems concerned and to indicate the direction researches in this phase of marketing may well take.

THE POTENTIAL SUPPLY AREA OF THE CHICAGO LIVESTOCK MARKET[1]

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In a previous study of the Chicago livestock market,[2] the areas from which supplies were drawn in competition with other markets were shown. An attempt was made also to account for the differential advantage or disadvantage of the Chicago market in attracting the various species of livestock from different parts of the producing territories over the seven-year period 1923-1929. The seasonal aspect of competition was also examined and differential receipts at Chicago with respect to competing markets were related seasonally to differentials in prices for comparable kinds and weights of livestock. In effect, the actual supply area of the market was indicated and its drawing power in a territory relative to that of other markets was determined objectively so far as differences in receipts and prices at the markets were concerned. It is recognized, however, that this constitutes only a partial answer to the theoretical problem of measuring a market supply area where two or more markets are in competition in the same general territory.

Theoretically the supply area to which a livestock market may lay claim is all that territory in which net return to shippers sending stock to the market is equal to or greater than the return which they may receive by shipping to a competing market. The net return to the shipper is a function both of price at the market and the cost of reaching the market from his farm or loading station. A line may be drawn through points in an area between markets from which the net return to shippers will be the same whether they ship to one market or to another competing market. Such a line theoretically determines the respective supply areas of the two markets. An increase in freight rate from one of these points to market A, or a decrease in price at market A, will throw part of its territory to market B, provided like changes in price and rates have not taken place at B.

The economic forces at work in such a market situation where competition prevails seem to tend always toward equilibrium. Hence the strategy of a marketing organization is to disturb this

[1] The author is indebted to David A. Revzan, research assistant at the University of Chicago for reading livestock tariffs and drawing maps.

[2] The Supply Area of the Chicago Livestock Market, Edward A. Duddy and David A. Revzan. The University of Chicago Press, Chicago, 1931.

tendency toward equilibrium in its own interest—a policy which is made possible by the discovery of a maladjustment not in line with economic forces, as shippers in the country sending their stock to a market of lower net return due to ignorance of alternative prices and costs of marketing at other markets, or through habit. More fundamental causes of disturbance may be a change in freight rates, a change in buying practices by large buyers, regional shifts in livestock production which force both packing interests and markets to realign themselves with reference to the new source of supply.

Interference with the conventional or established behavior of the market is not reprehensible if one accepts the philosophy of competition as applied to trade. The result of such attempts to exploit those forces which turn the flow of trade in one direction or another will be good or ill according as the information upon which action is based is authentic and complete, or the reverse. Repeated readjustments of competing markets to their common supply area make each new disturbance more difficult if the adjustment has been intelligently made. An ideal adjustment of a market institution to the forces which control its action may be said to have been reached when any further attempts at readjustment of market facilities and services are made at costs which increase out of proportion to any benefit derived.

The purpose of the present study is to add somewhat to the constantly growing body of knowledge about the central livestock markets in the interest of facilitating a more perfect adjustment of these markets to changing economic conditions. More specifically, the objective of the present discussion is to delimit the potential area of hog supply for the Chicago livestock market under the conditions of prices and costs of marketing which prevailed over the period 1923-1929.

That there is an "economic law of market areas" was pointed out by Frank A. Fetter of Princeton University.[3] Taking the point of view of two selling markets competing for territory in which to distribute their products, he points out that with base prices in the two markets the same and freight costs equal, the boundary line or points of indifference dividing the territory would lie midway between the two markets.

"The location [of a dividing line] is on the boundary, or point of indifference in respect to two markets when the sum of base

[3] Fetter, F. A., The Economic Law of Market Areas. Quarterly Journal of Economics, Vol. 38, pp. 520-29. See also Clark, J. B. The Control of Trusts, 1912 Ed. pp. 104-112 and Fetter, Principles of Economics, Ed. 1915 Chap. 31.

prices and freights is exactly equal. On either side of such a point, in the direction of the two markets, respectively, as the freight rates are higher or lower, the delivered cost from one market must be greater or smaller than that from the other. This is a numerical relationship of just the same kind as that in the formula of a hyperbolic curve, which is such that the difference of the distances from any point on it to two fixed points called *foci,* is the same. Railroad freights are paid to overcome distance and vary more or less proportionally to distance. A succession of such points of indifference in delivered cost would graphically take the form of a hyperbolic curve in just the measure that the freight rates did vary in exact proportion to distance and that goods could be shipped on a perfectly straight route from each market to every point in the territories considered, assuming likewise that the two base prices were alike to all buyers at the same time, as they would be under full competitive supply and demand conditions. On these conditions we get the following formulation of the general law of market areas:

"The boundary line between the territories tributary to two geographically competing markets for like goods is a hyperbolic curve. At each point on this line the difference between freights from the two markets is just equal to the difference between the market prices, whereas on either side of this line the freight difference and the price difference are unequal. The relation of prices in the two markets determines the location of the boundary line: the lower the relative price, the larger the tributary area.

"With base prices unequal, the boundary between the two tributary territories is a curve bent around the focus, or market, with the higher base price, and with its two sides diverging in a general direction away from the focus, or market, with the lower base price.

"In case both market prices change at once, either in the same or opposite directions, the effect upon the shape of the boundary curve depends not on the absolute change but on the relative change or change in the differential between them.

"Size of market territories thus may be said to be a function of the differential of market base prices, freight rates remaining constant and vice versa: that is, the higher the market price in any market, relative to that in its geographical competitor, the narrower the territory that economically is tributary to it."[4]

In the case of buying markets it must be apparent that the

[4] Fetter, op. cit. pp. 523 ff.

situation described above is reversed. The line dividing the area between the two markets will bend around the market of lower price and away from the market of higher price. "The higher the buying market price relative to its competitor, the larger the area from which it can attract sellers to it."

The problem is that of determining how this law operates under actual conditions of freight rates and prevailing market prices over a period to delimit an area of exclusive advantage from which livestock may come to a market with as great or greater net return to shippers in this area than they could receive by sending their stock to a competing market. Having determined this area of potential supply on a theoretical basis, the problem is, further, to check this theoretical area against the area from which the bulk of livestock was actually received.

The method resolves itself into a process of determining the average monthly price differences which prevailed at Chicago for 200-250 pound hogs, medium to choice, relative to other competing hog markets. The prices used are monthly averages per 100 pounds as reported by the Bureau of Agricultural Economics for the different markets for a seven-year period, 1923-1929. Arithmetic averages of the price differences for each pair of markets for each month were obtained, and a seven-year average monthly price differential thus determined. From these seven-year monthly averages a maximum seasonal price difference was taken by averaging the price differences of those months which showed a differential equal to or greater than the average differential of all the months. Similarly, a minimum seasonal differential was obtained by averaging the remaining months. The average of the seven-year monthly average differentials was taken as a seven-year average annual price difference between the markets. The competing markets for which price differentials over or under Chicago were computed were Omaha, East St. Louis, St. Paul, Kansas City, St. Joseph, Sioux City, and Denver.

Differences in terminal marketing charges were also taken into consideration. Such charges as are here considered include: terminal transportation and switching, yardage, commission. All of these charges except feed were reduced to a 100-pound live hog basis: the standard single deck car, 36 feet 6 inches in length, with 17,000 pound-minimum was used in distributing charges assessed on a per car basis. It was necessary to adopt this method because price differences between the markets and freight costs were also computed on this basis.

While the amount of the terminal charge per car is considerable, this becomes of little importance when looked at as a differential cost per 100 pounds. For example, a difference of $1.70 per car becomes a differential of one cent per hundred pounds. In most cases there is no differential terminal marketing charge between markets. In only two cases were the differences thought to be significant enough to figure in the cost of marketing.[5]

The chief marketing cost is freight, and since freight is paid to overcome distance, the distance from which a market with a price advantage can draw in competition with a market over which it enjoys such advantage will be represented by the amount of freight cost which the favorable price differential will pay under existing freight tariff conditions. Accordingly, the favorable price differential of Chicago, less any difference in terminal charges against Chicago, was converted into freight cost at rates prevailing in the tariffs of the different railroads serving the area of supply common to the two competing markets. For example, in the competition between Chicago and Omaha the average annual price difference of 42 cents in favor of Chicago was converted into freight cost on the Chicago, Milwaukee, St. Paul and Pacific, the Chicago, Burlington and Quincy, the Chicago Rock Island and Pacific, the Chicago and Great Western and the Chicago, St. Paul, Minneapolis and Omaha railroads. Points were located on these railroads intermediate to the two markets. A line joining these points gave a first approximation to a division of territory between the two markets on a basis of differential costs and prices.

It was evident, however, that the difference in distance from any one of these points to the two markets would be reflected in differences in shrinkage cost, and that these shrinkage costs would vary seasonally in amount and value. Data of shrinkage cost of livestock in transit are not well developed. It is well recognized that shrinkage is a function of many more variables than distance and season of the year. An arbitrary averaging of the shrinkage data of a number of different studies,[6] and the varying of shrinkage cost with distance and season only, must admittedly give only approximate results.

The method of determining differential shrinkage cost per 100

[5] A one-cent difference in terminal charges was allowed in favor of East St. Louis and St. Paul as against Chicago.

[6] Report of the Federal Trade Commission on the Meat-Packing Industry, Part VI, pp. 137-183; Cooperative Marketing of Livestock in Nebraska, Neb. Exp. Sta. Bull. 209; Monthly Letter to Animal Husbandmen, Armour's Livestock Bureau, Dec. 1926, August, 1929; unpublished data of Iowa Agric. Exp. Sta. on hog shipments of cooperative shipping associations.

pounds was as follows. Under conditions of an average price difference between markets the seasonal factor was eliminated. Shrinkage per hundred pounds for the distance from a point already located as described above to Chicago was figured at the price prevailing at Chicago. Shrinkage for the distance to Omaha was figured at the price prevailing at Omaha. The difference between the two costs was assessed against the market of higher price, i.e., the more distant market. Under conditions of maximum or minimum price differences prevailing at different seasons, the shrinkage was figured at maximum or minimum prices in the respective markets to determine a shrinkage differential.

Differential shrinkage cost against a market (the market of higher price) was converted into freight cost, and the point originally located in terms of differential price and terminal costs was relocated nearer the market of higher price. Points thus located were taken as points of indifference from which net returns to shippers of livestock were equal to both markets, prices and costs of reaching the market considered. A line drawn to connect such points located on the different railroad lines traversing a supply area resulted in a division of territory that gave to the market with the favorable net price difference the larger supply area. The potential area of each market extended up to this line.

Since it is the practice of livestock trading in public markets to quote prices to the nearest five cents, points within a five cent range of the net price differential[7] were included. Furthermore, since the freight tariffs often blanket several points with the same rate, the line of demarcation often became a zone.

The Competition between Chicago and East St. Louis

Over the seven-year period considered, the following average monthly price differentials in favor of East St. Louis on 200-250 pound hogs prevailed:

1923	1924	1925	1926	1927	1928	1929	7 yr. av.
.07	.10	.20	.15	.07	.10	.02	.10

The maximum seasonal advantage in price was 14 cents; the minimum seasonal advantage was six cents. East St. Louis also enjoyed a differential of one cent a hundred pounds over Chicago in terminal charge.

[7] The net price differential = the price difference between markets corrected for differences in terminal charges and shrinkage cost.

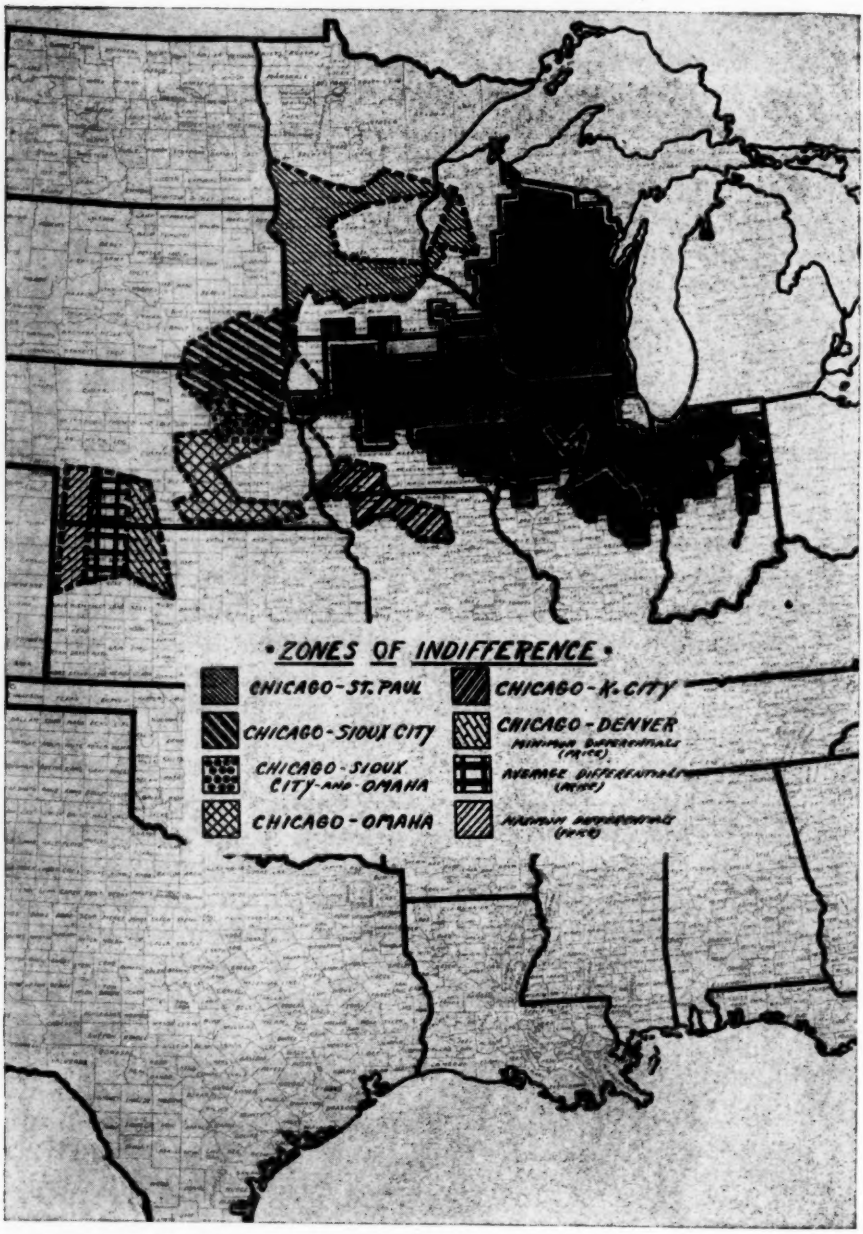
• ZONES OF INDIFFERENCE •
CHICAGO - ST. PAUL
CHICAGO - SIOUX CITY
CHICAGO - SIOUX CITY - AND - OMAHA
CHICAGO - OMAHA
CHICAGO - K. CITY
CHICAGO - DENVER

FIGURE 1.—The potential hog supply area of the Chicago market is shown within the heavy dotted line which cuts the black area and which lies east of the Kansas City, Omaha, Sioux City, and St. Paul markets. The zones of indifference are areas from which net returns to shippers are the same at either market. The solid black line indicates the counties from which 75-100 per cent of the total rail-haul shipments of hogs moved to Chicago in 1927.

The effect of converting these differentials into freight cost, with correction for differences in shrinkage cost, is shown in figure 1. The line of indifference extends across Indiana and Illinois to a point in Iowa just west of Des Moines. While the line determined by the average price difference is quite irregular, it bears some resemblance to the hyperbolic curve described by Fetter, bending about the market of lower price (Chicago) and restricting its supply territory. The line of maximum price difference comes appreciably closer to Chicago. Not much change from the average line results from the use of a minimum price advantage.

The character of the freight rate structure has much to do with the division of territory in Illinois and Iowa. A disproportionately large part of western Illinois is thrown to the East St. Louis market because the Rock Island and Burlington railroads which cross through this territory quote equal rates to both markets from points in Illinois. The price differential in favor of St. Louis is large enough to offset a considerable shrinkage differential against that market in northwestern Illinois.

In Iowa, the area going to East St. Louis is restricted to that part of the state served by the above two roads which quote through rates to both markets because they have terminals there. The central and northern part of the state becomes Chicago territory by virtue of the fact that the roads serving this territory quote through rates to Chicago but only combination rates to East St. Louis. A large part of this Iowa area also is "blanketed" with a 36 cent rate per hundred pounds to Chicago Thus the normal effect of the high price differential at East St. Louis is interfered with by the peculiarities of freight rate structure and the lack of a direct route from north central Iowa to the East St. Louis market. It is only by the use of its maximum price advantage that East St. Louis can get into southwest Iowa against Chicago.

This picture of the division of territory in Indiana, Illinois, and Iowa between Chicago and East St. Louis is over-simplified because it ignores the competition of such important markets as Indianapolis, Peoria, and interior packing plants and concentration yards in Iowa. Since much of the business done at these markets is on a trucking rather than a rail haul basis, and since price data for interior markets in Iowa were not available, it was not possible to show the effect of such competition on the division of potential areas.

The Chicago-Omaha Competition

The division of territory as between Chicago and Omaha presents a problem not encountered in the competition beween Chicago and East St. Louis. Chicago shows the following price differentials on 200-250 pound hogs over Omaha for the seven-year period:

1923	1924	1925	1926	1927	1928	1929	7 year av.
.41	.46	.40	.46	.38	.37	.46	.42

The maximum seasonal differential prevailing during April-October was 48 cents a hundred pounds; minimum seasonal 34 cents.

Since the freight rate on a single deck car of live hogs from Omaha to Chicago is 42½ cents a hundred pounds, it was impossible to use either the average or maximum seasonal price differentials with allowance for shrinkage in allocating territory between the two markets. An application of these differences would take Chicago right into the Omaha market. Therefore the minimum price differential of 34 cents was used in locating the line shown east of Omaha in Iowa. No point on this line is more than fifty miles from Omaha.

Freight rates are paid to overcome distance but they are not increased in proportion to distance. Thus as distance increases from a market, the burden of freight costs becomes lighter relative to that borne by a shipment destined to a near-by market with which the more distant market is in competition. Similarly with shrinkage cost: most authorities agree that the maximum rate of shrinkage occurs during the first 50 to 100 miles of the journey to market. Added distance does not impose added proportionate shrinkage cost. Thus, again, the near-by market is penalized in competition with the more distant market. It is these peculiarities of freight rate structure and shrinkage cost which enable Chicago on the basis of its minimum price difference to reach beyond Omaha into a zone enclosing that market on the west. (See Figure 1) From points in this zone, net returns to shippers are the same regardless to which market they may ship. In the area immediately surrounding Omaha, that market has an exclusive advantage in competition with Chicago.

In the area west of the zoned territory, Chicago has a net advantage in competition with Omaha. The western limit of Chicago's power of drawing hogs from this area is set by the Denver market. The zones of minimum, average, and maximum price advantage shown in Figure 1 divide the territory between Chi-

cago and Denver, Chicago's favorable price difference being sufficient to restrict Denver to the western parts of Nebraska and Kansas.

The Competition of Chicago with Sioux City

A situation very similar to that at Omaha results from the competition of Chicago with Sioux City for hogs from Iowa, South Dakota, and Nebraska. Chicago's advantage in price differential over the seven-year period was as follows:

1923	1924	1925	1926	1927	1928	1929	7 year av.
.47	.52	.39	.56	.46	[8]	.52	.47

The maximum seasonal price difference obtaining in May and July-October was 62 cents; the minimum seasonal was 37 cents. Since the freight rate on a single deck car of hogs from Sioux City to Chicago is 42½ cents a hundred pounds, it is again necessary, as in the case of Omaha, to use the minimum price differential as a basis for allocating territory between the two markets.

When the minimum seasonal price differential is applied, a line enclosing the Sioux City market on the east results. (See Figure 1.) All area east of this line is potential hog supply territory for Chicago. Both this line and the line enclosing the Omaha market on the east curve away from Chicago, the market of higher price. Similarly, a zone of indifference results in the area west of Sioux City. In the dotted area lying between the Omaha and Sioux City zones of indifference all three markets are equalized. Shippers in this zone may ship hogs to either Omaha, Sioux City, or Chicago with equal net return. In the territory west of the zone of indifference about the Sioux City market Chicago may draw hogs as against Sioux City, due to the difference in the rate at which freight costs are increased to the two markets.

The Chicago-St. Paul Competition

Again Chicago enjoys a differential price advantage over St. Paul for the seven-year period under consideration. The price differences for 200-250 pound hogs for each year were as follows:

1923	1924	1925	1926	1927	1928	1929	7 year av.
.50	.50	.49	.37	.43	.37	.38	.43

The maximum seasonal price difference which prevailed in May and July-November was 50 cents, the minimum seasonal 36 cents.

[8] Data of prices at Sioux City for 1928 incomplete. For 1923-27 data of prices are from the *Sioux City Livestock Record.*

Again the maximum and average price differences are larger than the freight rate of 41½ cents per hundred pounds on a single deck car from St. Paul to Chicago. Thus the points dividing the potential areas of the markets have been determined on the basis of the minimum seasonal price differential.

The boundary lines resulting from the use of this minimum are shown in Figure 1. They describe a large zone of points of indifference extending irregularly about St. Paul as a center and connecting at its southwest corner with the zone enclosing the Sioux City market. The area immediately surrounding St. Paul belongs exclusively to that market. In the large territory lying outside the zone of indifference, Chicago has an advantage over St. Paul in bidding for live hogs.

Of lesser importance, so far as number of hogs coming to Chicago is concerned, is the competition of Chicago with Kansas City and St. Joseph in southwest Iowa, southeast Nebraska, northeast Kansas, and northern Missouri. The average price differences are in favor of Chicago as against Kansas City for the seven-year period:

1923	1924	1925	1926	1927	1928	1929	7 year av.
.29	.25	.20	.26	.27	.31	.32	.27

The maximum seasonal price difference which prevailed in March-May and in August-October was 33 cents; the minimum seasonal was 21 cents.

Only three years of price data are available for the St. Joseph market, the average price differences being as follows:

1927	1928	1929	3 yr. av.
.26	.30	.34	.30

The maximum seasonal price difference which prevailed during February-June and August-September was 33 cents; the minimum seasonal 26 cents. On the basis of a minimum seasonal price differential for both these markets a line is determined which connects at its western end with the line dividing Omaha-Chicago territory, and at its eastern limit passes well within the area already marked off from Chicago by the line of East St. Louis competition.

Now if one looks at Figure 1 he sees that the intersection of the curved lines marking off the potential supply area in Chicago from that of each competing market results in a compact area extending irregularly in a triangular pattern with Chicago lying near the southeast corner. It should be noted that in every case the boundary line separating Chicago from a competing market

bends away from the market of higher price and takes roughly the form of the hyperbolic curve described by Fetter. The shape of these curves on the outer side of the zones of indifference is reversed. Beyond these zones is an indefinite scope of territory which is potential for Chicago hog supply.

The question which one immediately wishes to ask is: "How closely does this theoretical area of potential hog supply, as determined by a balancing of prices and costs of reaching the market, fit actual shipping conditions?" Only a partial answer can be given to this question, because while data of marketings at the different markets are accessible by states of origin, the state is too large a unit to check by. The lines and zones of indifference do not conform to state boundary lines. Fortunately there is available for the single year 1927, data of the origin of hog receipts at public markets on a county basis. These data, however, include only the rail-haul movement. Through the courtesy of the Packers and Stockyards Administration of the United States Department of Agriculture, the data necessary for making Figure 2 have been made available.[9]

Figure 2 shows the counties from which each competing mar-

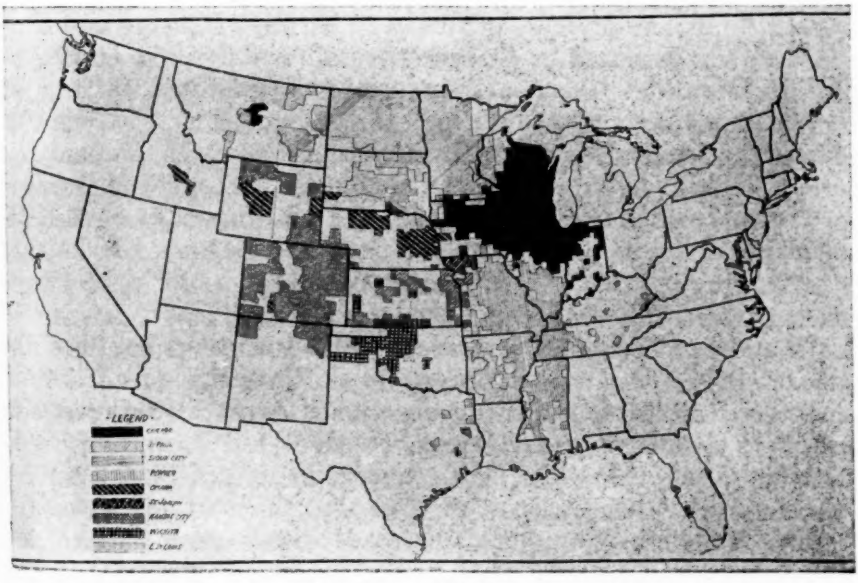

FIGURE 2.—Counties from which 75 to 100 per cent of rail-haul shipments of hogs moved to different markets in 1927.

[9] Data compiled by Dr. Howard D. Dozier of the Packers and Stockyards Administration from the records of stockyards companies at nine principal markets: Chicago, East St. Louis, Omaha, Kansas City, St. Joseph, St. Paul, Sioux City, Wichita, and Denver.

ket was able to draw from 75 to 100 per cent of the total marketings of hogs which moved by rail in the year 1927. Thus these areas tributary to each market may be regarded as areas of exclusive advantage for the respective markets and as the equivalent of the theoretically-determined potential supply areas. The white strips showing between the cross-hatched patterns of the different markets are competitive in so far as there is any marketable supply in these areas.

Now if the theoretically-determined potential supply area for Chicago be superimposed on the area of exclusive advantage as shown in Figure 2 the general resemblance of the two areas is apparent. There is at least a close enough correspondence to confirm the validity of the method used in determining the area of potential supply.

The coincidence of the lines of theoretical and actual advantage of the Chicago market as it comes into competition with East St. Louis in Indiana is of little practical importance since neither market draws an appreciable number of hogs from this state. The competition of Indianapolis, Lafayette, and Fort Wayne makes Chicago's influence in the northern part of the state even less important than it appears from the figure.

In Illinois, the division of territory between Chicago and East St. Louis is obscured by the intermediate competition of Peoria, Springfield, and lesser markets which are served mainly by trucks. These trucking zones vary from a radius of 25 to 75 miles. These trucking markets greatly reduce the apparent importance of the actual pulling power of Chicago in eastern Illinois based as it is on rail-haul movement only.[10] A readjustment of the line of actual Chicago receipts on the basis of total hog marketings would bring the line of actual receipts as shown in Figure 1 very close to the theoretical line of potential competition.

In western Illinois Chicago retains its advantage south of the line of potential competition due to the fact that train service and time in transit to Chicago are much more advantageous to shippers sending hogs to Chicago as compared with shipping to East St. Louis.[11] Practically no hogs move out of these counties to East St. Louis in spite of the fact that the St. Louis price difference is high enough to overcome differential freight and shrinkage costs.

[10] Total rail-haul as given in the report of the Packers and Stockyards Administration refers to the combined rail movement to the following markets only: Chicago, East St. Louis, Kansas City, Wichita, St. Joseph, Denver, Omaha, Sioux City, and St. Paul.

[11] From points on the Burlington or Rock Island railroads in this area, minimum time in transit is from 4.5 to 9.5 hours greater to East St. Louis than to Chicago.

Southeastern Iowa presents a case similar to that of western Illinois. Rates in this area under the line of potential competition are equalized on the Burlington and Rock Island railroads to both Chicago and East St. Louis, but train service and time in transit again favor Chicago.[12]

In this area also nine packer concentration stations are operating. A number of these are along the Mississippi River. A low proportional rate may be had from a large number of points in Iowa to these river points on shipments destined to move east of the Illinois-Indiana state line. Hog shipments may also move directly east by rail out of this area through Peoria without going either to Chicago or East St. Louis. That the main flow is east is evidenced by the fact that from only three counties in southeastern Iowa (Van Buren, Monroe, and Appanoose) did East St. Louis draw from 75-100 per cent of the hogs marketed by rail in 1927.

Chicago's advantage in this area is not as real as it seems because a great many hogs are diverted through the concentration points directly to the Atlantic seaboard. Local packers operating at Cedar Rapids, Davenport, Ottumwa, and Des Moines, served largely by truck, take large numbers of hogs away from both Chicago and East St. Louis.

A maximum seasonal price difference of 14 cents is necessary to carry East St. Louis west of Woodward, Iowa, in Dallas County on the Chicago, Milwaukee and St. Paul railroad. There is no effective competition for hogs by either Chicago or East St. Louis in southwest Iowa. This territory is divided among Omaha, St. Joseph, Kansas City, and local markets.

It is of more importance to note the extent to which the theoretical line of Chicago's advantage fits the 75-100 per cent limit of rail-haul movement, based on the data of 1927, with respect to Omaha and Sioux City. The seven-year minimum price differential of Chicago over Omaha was 34 cents per 100 pounds on live hogs, 200-250 pound average, medium to choice. Figure 2 shows that with this much of an advantage, Chicago all but excludes Omaha from the state of Iowa when freight and shrinkage costs are allowed against the two markets. Practically all the area in Iowa from which Omaha theoretically can draw is within a 50 mile radius of that market. It appears from Figure

[12] On the Burlington, which gives the best service from southeast Iowa to East St. Louis, minimum time in transit is from two to four hours longer to St. Louis than to Chicago. On the Rock Island railroad, minimum time in transit to St. Louis is from 24.5 to 38 hours longer than to Chicago.

2 that in very little of this area has Omaha an exclusive advantage on a rail-haul basis. The ability of Omaha to draw more heavily from Iowa than is indicated either by Figure 2 or the line of theoretical limit is suggested by the fact that in 1927, 24.75 per cent of Omaha's total hog receipts (650,983)[13] originated in Iowa and that in the same year 28.27 per cent of Omaha receipts came by truck.

It is significant that there is no evidence from the rail-haul data of 1927 that Chicago gets any hogs from the zones of indifference west of the Missouri River except those which originate at such markets as Omaha, Sioux City, and Sioux Falls.

The Sioux City market with a minimum price differential of 37 cents a hundred pounds under Chicago presents an identical relation with that of Omaha so far as division of Iowa's territory is concerned. An even heavier trucking movement is present at Sioux City, 39.72 per cent of total receipts of hogs coming to market by truck in 1927. The effect of the trucking activity which has increased steadily at both Omaha and Sioux City since 1927 must necessarily be to push farther east the lines of theoretical competition which hedge these markets about, bringing them more into line with the pattern of rail-haul movement to Chicago as shown in Figure 2.

The division of territory in Minnesota and Wisconsin as between St. Paul and Chicago on the basis of a minimum price differential of 36 cents is shown in Figure 1. It is apparent that Chicago's power of drawing hogs as indicated by the rail-haul data for 1927 is not as great as is theoretically possible. The reason for Chicago's failure to draw from 75-100 per cent of the total rail-haul movement in southern Minnesota is in part accounted for by the presence of strong local packers at Austin, Winona, and Albert Lea in southern Minnesota, and at Mason City in north central Iowa. It is significant that St. Paul's ability to draw from 75-100 per cent of the rail-haul movement in Minnesota and in western Wisconsin as shown in Figure 2 is much greater than is indicated by the theoretical limits set for this market in Figure 1.

With respect to the indefinite expanse of territory lying west of the zones of indifference around Omaha, Sioux City, and St. Paul, there are no points in this area from which, theoretically, hogs may not be shipped at a profit to Chicago in competition

[13] Hogs on farms, Jan. 1, 1927, in the 6 Iowa counties within or partly within the theoretical line numbered 687,600.

with the above markets. Practically, as shown in Figure 2, hogs do not move in volume directly out of this territory, though a large number of South Dakota and Nebraska hogs come to Chicago as inter-market shipments from Sioux City, Sioux Falls, and Omaha.

It is the practice of buyers at these markets to purchase hogs which originate in Nebraska and South Dakota but which are billed to points on and east of the Mississippi River. Shippers stop at Sioux City or Omaha to "try the market." If it be assumed that one such shipment is billed through to Chicago and stops at Omaha, then the balance of the through rate from the origin point payable from Omaha to Chicago is generally less than the regular through rate of 42½ cents which applies on a single deck car from Omaha to Chicago. Since the farmer, if he sells his hogs at Omaha, is required to pay the local rate into the market, the buyer at Omaha with a freight balance in his favor, can often make a profit by buying on the market rather than in the country. Thus Chicago, by means of inter-market shipments, reaches beyond Omaha and Sioux City into the zones of indifference about these markets, although there is no evidence of shipments to Chicago originating in these areas.

With respect to the major portion of Chicago hog receipts, it may fairly be asserted that they originated in 1927 within a territorial limit which, with two important exceptions,[14] was included within a line which might be theoretically determined on the basis of the price differences prevailing at the markets with which Chicago was competing—these price differences being adjusted for differential marketing costs and converted into freight advantage in accordance with existing livestock tariffs. The integrity of the rail-haul movement as shown in Figure 2 is subject to considerable qualification, as has been pointed out, due to the existence of vigorous local competition in the area within which Chicago enjoys both a theoretical and a practical advantage. There is no way of segregating these local areas of competition until more data of prices paid at these local markets are available, and until more reliable data of comparative costs of trucking and rail-haul movement are at hand.

[14] Southeastern Iowa and west central Illinois.

ELEMENTS OF SUCCESS IN COOPERATIVE SELLING[1]

JOHN BRANDT
LAND O'LAKES CREAMERIES, INC.

I take it from the subject that is assigned to me that I am to discuss the factors that enter into the problems of merchandising products produced by cooperative associations and for this reason I feel it is quite necessary that I make a distinction between cooperative gathering of farm products and cooperative selling. In discussing cooperative marketing many of us are apt to include in the group of cooperative selling agencies a large number of institutions whose function is mainly the gathering of products to be graded and concentrated for re-shipment or manufactured to be turned over to someone else to sell for us. For this reason I feel that it is very essential that anyone placed in a position of advising or directing cooperative selling effort should be one who fully recognizes the difference between cooperative gathering and dumping our products into the laps of someone else to sell for us, and actual cooperative selling of merchandise. It is quite often necessary in organizing a cooperative selling association to temporarily limit its activities to quality improvement work, or to grading and assembling for re-shipment, but if it is the aim and purpose of the organization to stop at this point, then the future of cooperative work has very little in store for it. This is especially true in the present-day field of competitive merchandising as there is a growing tendency on the part of large distributing organizations not only to control the distributing end of the business but also to develop their own concentration and manufacturing institutions to deal directly with the individual farmer while at the same time they are getting a large part of their supply from cooperative gathering organizations. For this reason, I cannot over-emphasize the importance of selecting as advisers and directors of cooperative associations the type of men who are thoroughly sold on the idea of developing a truly merchandising organization that has for its purpose the elimination as far as possible of all unnecessary transportation and distributing costs and that will deliver its product through the most direct channels to the retail outlet. These men must have courage and ability and have the cooperative viewpoint, and while experience is desired, yet it is not always this factor that should determine selection of men.

[1] Paper read at the twenty-first annual meeting of the American Farm Economic Association at Cleveland, Ohio, December, 1930.

I would place as the most important element in success of cooperative selling the selection of the board of directors of the institution and even though they may not know all of the activities of the organization, they are the ones to select the managers of their business affairs. Many a cooperative organization has fallen by the wayside simply because the directors in hiring a manager to carry on their business affairs did not recognize the fact that there is a vast difference between a man of organization ability, and one who can direct the business affairs after an organization is once set up. Instead of employing a man with both organization and business ability or of getting someone to head a merchandising organization, they have, either through lack of courage or knowledge, placed their entire business affairs in the hands of someone with whom they have built up a friendly relationship and respect, and have lost sight of the fact that he does not have the business ability to carry on the work of a selling organization.

It is very important that in laying a program of procedure before a group of prospective members that the possibilities of success be not over-emphasized. Promises that cannot be fulfilled soon ruin the morale and loyalty on the part of its members toward the selling organization.

The factors that enter into the success of any business also hold true in cooperative selling. These factors are economic production, standardization of manufacture, and merchandising. Under the heading of economic production, we must start with the production of the raw material. If farmers can be taught through their own organization to produce at low costs and if some of the materials that enter into their production can be bought through a department in their organization that will save them money, they will view this service as one of the good things the organization can do for them and be willing to follow other parts of the program that may be a little further removed from them. If products handled by the selling organization are of a nature that require certain manufacturing processes, a central service that can employ expert talent can be of invaluable assistance in cutting down manufacturing costs.

In order that individual members may be conscious of ownership of their own institution, the organization of local cooperative groups that brings the feeling of ownership right to the door of the producer is an important element in the success of a central marketing organization. If the activities become too far

removed from the actual producer, he becomes disinterested and easily falls for such propaganda as may be directed against his cooperative association.

Where grading and manufacturing become part of the operation of the local unit, an effective plan of supervision and direction of these activities by the marketing organization must be carried out; otherwise, it would be impossible to have a standard product to merchandise in competition with larger proprietary organizations. A strict program of grading and paying the farmer according to quality may seem rather difficult to put into operation and many managers of cooperative associations hesitate to take the step but any cooperative that does not recognize the importance of producing high quality products will never succeed in the selling game. Being owned and controlled by producers that are in the best position to induce farmers to accept their grades and be paid accordingly and when they go out into the markets with the advantage and reputation as producers of the highest quality possible, they are in a field by themselves and have every chance of winning the confidence of both the retailer and the consumer.

Any cooperative association may be perfect in all the elements that enter into the field of production and standardization but if it neglects the all-important part of their business which is the building of a sales organization that will seek direct outlets under a well advertised brand of its own, there is little chance of permanent success. We are living in an age of keen competition for the consumer's dollar. The average worker spends nearly all that he makes and the sales organization that does the best job of advertising and telling the wage earner what he should spend his money for gets more than his share of the consumer's dollar, and while it is impossible at the outset for any cooperative sales organization to carry on an effective advertising campaign, it must be part of its future plans and even though it must start in a limited way, it should do so as soon as possible. Whether or not its attention should be directed toward national or local advertising depends largely upon the nature of the business and the outlet for the product.

The selling of products in a wholesale way and in bulk form without any identification as to the manufacturer or producer of the product other than such as is recognized only by the jobber or commission man will not insure the continuous outlet and a demand on the part of the consumer, and while many coopera-

tive associations at the beginning of their operations when they have only a limited sales organization, find the wholesale method in bulk form the cheapest and most convenient method of distribution, there is no real permanence or stability to a program of this kind. I know of many creameries manufacturing some of the finest butter produced anywhere in the country that have shipped their products in bulk form to eastern markets for many years with no other identification mark except a stencil number that no one except the wholesaler, jobber, or commission man to whom the shipment was made ever recognized, and as small individual units, it was, of course, impossible for them to do otherwise. It was either a case of put up their butter in this manner or print it under the other fellow's brand, over which they had no control or interest.

One of the greatest obstacles that any cooperative organization which enters the selling field has to overcome is the buying habits of consumers and their demand for an established, well-known, well-advertised brand of goods. Even though it may seem difficult and an almost hopeless task, every cooperative selling agency must sooner or later insure its future consumers' demand for its products through establishing and advertising its own brand of goods. By this I do not mean to infer that all the products handled should be sold under their own brand as every organization must have sufficient volume to operate at low cost per unit, and for this reason, the packing of private brands is often advisable and profitable and it furnishes an outlet for products in excess of the association's own brand for which consumers' demand has been established. I feel that it is not advisable for any small group to attempt establishing a brand of its own except possibly for local trade, as it is impossible in this present day of keen competition to create any great demand for branded goods unless it is done so through an extensive program of advertising.

I am sure that one of the prime factors in the future success of cooperative selling will be the education of the membership of cooperative selling organizations to the value of advertising their products under a brand name. One of the great drawbacks to the organization of a cooperative selling agency that will bring together many small units is the personal element that enters into the direction of small cooperative associations. In small independent units, there is considerable prestige afforded certain individuals who have been given positions of authority in the

conduct of the business and the bargaining for both purchase and sale of their products. The very fact that in joining with some larger selling organization they will automatically be deprived of some of this prestige and that their duties will resolve to the business of directing the policies of concentrating and manufacturing their products will in itself often prevent such parties from joining with the larger groups even though in their judgment it may be the best for the industry.

So many times leaders of cooperative associations only judge success of their institution on a basis of price comparison between what they are able to get and what some group receives that may have recently organized a large cooperative selling organization. If we are to judge success on a basis of whether or not we receive premiums over or under the market that someone else has established for us, cooperative marketing is going to do very little to bring about better conditions for agriculture; but if we view it from the standpoint of the effect a large marketing organization that may be in control of a large percentage of a certain product will have on establishing this quotation, then we are leading off in the right direction.

Modern merchandising has brought about many changes and developments that must be applied to cooperative selling. Diversification of activities is necessary to success. While I am not a believer in handling a variety of products that have too wide a range in relationship and distribution possibilities, I do believe that such products as are related and manufactured from the same raw materials or even such products as may not be closely related but are carried to the consumer throughout the same medium of distribution can well be considered as part of the family of diversified products that should be handled through one selling agency. For instance, in the dairy line there are many such products as milk, butter, cream, cheese, milk powder, casein, and some of the by-products manufactured from milk that will go well together through one sales agency, and even though eggs and poultry are not dairy products, they also fit in well with a sales program that is outlined for dairy products.

Transportation costs are a real factor and many times, especially where trucking systems are used, it is even necessary to handle products such as feed and equipment in order to have a load going both ways to reduce transportation costs.

Improper finance due to faulty accounting systems often causes over-expansion and unwarranted payments with its at-

tending failures due largely to the fact that the direct officers are not properly informed as to the financial standing of the organization or the possible capital requirements for carrying out a certain project. Too often men of character and ability without accounting experience are chosen for the important position of directing and handling of an organization. I have seen men chosen by a majority vote of an organization for this particular position with no qualification whatsoever to fill the position other than his popularity among the members of the organization. This is one position that honesty and good judgment alone cannot fill, and any organization that does not choose a man of experience in this work cannot hope for anything other than disappointment.

A well-informed membership that is being continually educated in the newer ideas of merchandising that is being continually carried along with the developments of large merchandising organizations is one of the elements that is essential to the success of any cooperative association. So many times our membership is thinking in terms of the peanut stand or the popcorn wagon and the selling organization is launching forth into fields of merchandising that are far beyond the comprehension of the average member. At best, it is extremely difficult to get the mind of the average producer to think in terms of large merchandising operations where activities and transactions run into millions and expenses, while low per unit, seems all out of reason and proportion to the average layman. For this reason, every cooperative selling organization should give real thought to the development of a department whose duty it is to contact and educate the membership in the new and advanced ideas of merchandising. This is not a department that can do its work this year and quit operating next year. Conditions are changing so fast that each year the work of keeping the membership informed and in a manner that they will have the proper attitude and spirit of loyalty toward the selling agency becomes more and more essential.

ELEMENTS OF SUCCESS IN COOPERATIVE PURCHASING[1]

H. E. Babcock
Manager, Grange League Federation Exchange, Inc.

What little I know about cooperative purchasing has necessarily been gained from first-hand experience. As I look back on this experience, the one big lesson I have learned I now realize I could have picked up in five minutes from any standard textbook on marketing.

Instead, it took me six years to find it out by the cut-and-try method. When I finally did get it through my head, my organization jumped in one year from ten to nineteen million in volume and from a net margin of $100,000 to $500,000. Naturally, therefore, I put down as a first element for success in cooperative purchasing that lesson. In doing so I am fully aware, as I have indicated above, that I am not contributing anything to marketing information but I do hope that my report of my experience will save some other cooperative group the six years of hardship that mine went through.

Stated as briefly as possible, I regard recognition of the fact that there are two separate and distinct functions to be performed in cooperative purchasing as the fundamental of first importance.

One of these functions is distinctly a community enterprise which I shall call "retail purchasing service." The other is a regional activity which I shall call "wholesale purchasing service."

The first has to do with the individual farmer and his needs. The second has to do with community railroad points, and the needs of the majority of the farmers living in these communities. Now it is my experience that both cooperative retail purchasing service and cooperative wholesale purchasing service may be successfully operated by farmers. And I do not concede that one should necessarily be developed before the other. I do know, however, that the two jobs must be viewed separately and each one worked out for what it is.

For that reason I shall divide what I have to say into comments on, first, cooperative wholesale purchasing service and then on cooperative retail purchasing service, with a few remarks at the end on what I believe the best ways to correlate the two.

[1] Paper read at the twenty-first annual meeting of the American Farm Economic Association, Cleveland, Ohio, December, 1930.

Wholesale Purchasing Service

The first consideration in setting up a cooperative wholesale purchasing service to buy for a region is *potential volume.* This determines the size of the region that should support the service. Fine examples of natural buying regions are the New England States and the New York Milk Shed. Much poorer regions to my mind, because they lack potential volume, are Maryland and Virginia. Certainly state lines are not a safe guide to follow in setting up cooperative wholesale purchasing services, and so far as I know there is no single state in the Union, unless it be California, that has enough potential volume within its borders to make a wholesale purchasing service worth while. So forget state lines.

Next to potential volume comes finances. Both wholesale and retail cooperative purchasing activities require permanent capital and so far as I know no better method of providing permanent capital has been devised than the stock corporation. I, therefore, am emphatically in favor of the cooperative stock corporation with paid in capital as the only *safe* agency to use in cooperative buying. My experience teaches me that a minimum ratio of total paid in capital to volume of purchases is about 1 to 6, i.e., for $6,000,000 annual volume, $1,000,000 of paid in capital, though we have in the case of the G.L.F., partly as a case of necessity, gotten along with a ratio of 1 to 15, and have turned our working capital many times twice a month. (This is so fast, however, that if you don't watch out, you may develop a hot box and stall, or as one of my men put it, your money is apt to get hot and evaporate.)

Next to a fair potential volume and the necessary finances to handle it, comes the support of organized farmers and educational forces. The meanest competition in the world is that between cooperatives. No cooperative wholesale purchasing service buying for a region can hope to succeed if within that region are other cooperatives trying to do the same job. The Eastern States Farmers Exchange has had very little of this competition and my own G.L.F. practically none. Lack of it is largely accountable for our success.

Given the potential volume, the required paid in capital, the united support of the farmers to be served, and the backing of the educational forces there remains only the providing of management to complete the set-up of our cooperative wholesale purchasing service. This is not a serious question if the conditions I have outlined have been met. The trouble has been that in most

cooperative purchasing set-ups in the past, they haven't been, and as a result an undue load has been put on the management of the enterprise, which has resulted in an over-emphasized view of the importance of the job. Generally speaking, any good level-headed man who has the farmer's point of view and enough business ability to earn for himself what the cooperative can pay him will do, provided again, that the cooperative has equipped itself so he can function and not have to wear himself out getting in shape to do so.

Now just for the sake of hurrying along this presentation, let us imagine we have our cooperative wholesale purchasing service set up and going. Bear in mind it has paid in capital, that it is buying for a region, that this region has the required potential volume and that the units for which the buying is to be done are the community railroad points within the region. What then are the elements for successful operation? They are few and simply stated:

1. Orders must be obtained cheaply from the railroad communities.
2. Plants, whether leased or owned, must be run at as near capacity as possible.
3. Purchases must be made for cash and shipments the same way.
4. The program of service must strike a nice balance between what the educational forces are advocating and the practical farmer is doing.
5. Ordinary business sense must be used in managing the enterprise.

Once these principles are put into effect, your cooperative wholesale purchasing service immediately takes its position in the ranks of other wholesale or regional businesses both corporate and private. If its order-solicitation costs are low, if its plants run to capacity, if it takes advantage of cash discounts, it will make money which it can rebate or it can reflect in low prices; either way the farmer wins with it. Or if it can't put these efficiencies into such effect that it definitely gains an advantage over a competing business, it at least can serve in the quality of its goods and in the way its services are matched to good scientific practice and the needs of the everyday farmer. Here again the farmer wins.

So much for cooperative wholesale purchasing service. I have spoken of it as it ought to be spoken of, as separate and distinct

from community cooperative retail purchasing services. In fact, the field of the wholesale purchasing service, when you think of the conditions I have laid down, is distinctly limited. Fifteen or twenty such services are enough to serve the whole United States. Yet if I am not mistaken there are more than this number already set up, at least part of them competing with each other.

Retail Purchasing Service

Now you may remember that at the beginning of this paper I made the statement that I did not think it was of much importance whether farmers developed cooperative wholesale purchasing services or cooperative retail purchasing services first as long as they realized each was a separate and distinct job. The reason is obvious. Machinery for both wholesale and retail purchasing already exists; the most the farmer can hope to do is to replace existing machinery with an institution of his own that will do the job more satisfactorily so far as he is concerned.

If for example farmers elect to launch a wholesale purchasing service, there is no reason why they cannot use already existing local dealers for retail service at least until they get ready to do the retail job themselves. Certainly, there is no reason why a private retail dealer should not buy of a cooperative wholesale service, particularly when the wholesale service is owned by his customers. As a matter of fact, 600 dealers are now so buying from my organization to the satisfaction of both themselves and the farmers they serve. By the same reasoning farmers lacking a cooperative wholesale purchasing service, need not wait for it. They can organize their own community retail purchasing cooperative. They will find all wholesalers ready to sell to them, and if the farmers are good cooperative operators, they will benefit themselves by this move.

The elements for success in such a move, i.e., the operation of retail purchasing service by farmers as I see them, are as follows:

1. A potential community purchasing volume of at least $40,000 annually.
2. Ability to launch and finance a cooperative stock corporation. (Paid in capital should be on a ratio of 1 to 10 of expected volume.)
3. No cooperative competition within the community.
4. A contact with some agency which knows the elements for successful operation. This may be an extension man, an auditor,

or some experienced and successful operator of a cooperative retail service. Lawyers won't do.

From such a contact the newly formed cooperative retail purchasing service would learn operating facts like these which apply in the New York Milk Shed.

1. The annual cost of a warehouse must not exceed 1 per cent of the gross dollar volume of the service.

2. Labor exclusive of bookkeeping must not exceed 2¾ per cent; to this may be added .5 per cent for bookkeeping.

3. Capital including dividends on stock and bad debts must not cost more than one-half of one per cent of the gross dollar volume.

4. The man who gets credit must pay for it. It costs 14 per cent on the money trusted out to grant credit.

5. The man who has supplies delivered must pay the delivery charge.

6. Inventories should turn once a week or oftener in busy seasons, and at least twice a month in dull. In 62 G.L.F. retail service agencies, inventories were turned 34.4 times last year.

A cooperative retail purchasing service observing these rules of operation will save farmers money.

Let me quote you some figures in the region served by the G.L.F. as a cooperative wholesale purchasing service, the gross margin taken by dealers for retail service averages 11.5 per cent, by 62 G.L.F. cooperative retail service agencies, 6.44 per cent, a saving of 5 per cent for the farmer at the start. The dealers' net profit averages 1.1 per cent, which he keeps. The cooperatives' .87 per cent, which of course goes back to the farmer, making him really a 6 per cent saving on his annual farm supply bill. Surely a worth-while saving, to add to any advantage he may have gained through his cooperative wholesale purchasing service.

All of which brings me to the point of the farmers who own both cooperative wholesale and retail purchasing services. What are their advantages? Why they can eliminate wholesale order solicitation costs altogether and they can run their wholesale plants on more even schedules. Thereby they will save from 2 to 5 per cent more on purchases that go through plants than can be saved without cooperation between wholesale and retail services.

We of the G.L.F. regard this saving as worth going after. For this reason we are encouraging the development of cooperative retail service agencies.

Another reason why we believe in these local agencies is that we have a vision of using a single cooperative corporation, locally

owned but with a degree of effective central supervision not only to give cooperative retail service on *incoming* farm supplies purchased through a cooperative wholesale purchasing service, but also to receive, grade, finance, store, package, and load *outgoing* livestock and produce. In short, to act as cheaply operated feeders to cooperative regional marketing corporations. However, that is another story.

PERTINENT PROBLEMS IN COOPERATIVE MARKETING OF COTTON[1]

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GENERAL MANAGER, STAPLE COTTON COOPERATIVE ASSOCIATION

Since the beginning of cooperative marketing of cotton one of the chief problems has been to obtain baleage. This problem has been discussed by many authorities and various methods have been suggested for obtaining baleage. But a satisfactory solution has not been found and, in our opinion, it will be a long time before the problem is really solved.

Baleage

It was thought at the beginning of cooperative marketing that a legally enforceable contract would insure deliveries, and in case of non-delivery the cotton could be demanded. At the outset many growers became dissatisfied and refused to deliver. The enforceable contract was tested and found to be legally sound. Through injunction or other court proceedings the recalcitrant member could be forced to deliver his cotton. However, the expense incident to forcing delivery, together with the dissatisfaction created in the mind of the membership, soon made it clear to the leaders that legal enforcement of contracts would do more harm than good. Early in the cooperative movement our Association abandoned the legal enforcement plan. Our contract was re-written, giving a member the right to withdraw and putting all deliveries solely on the basis of service. This method has proved superior to the original plan, but it has not succeeded in obtaining adequate baleage.

Probably the most effective means of securing baleage is to assist the grower with funds for crop production. It is a well-known fact that the mortgagee controls the sale of the cotton, either directly or indirectly. Likewise, if cooperative associations are to control a majority of the cotton produced in the South, satisfactory and efficient arrangements must be worked out for furnishing growers with funds for production. In our Association we have learned that we cannot control any specific amount of cotton, except by furnishing funds for crop production. Many of our members have been in our association for ten years and

[1] Paper read at the twenty-first annual meeting of the American Farm Economic Association, Cleveland, Ohio, December, 1930.

are unequivocally sold on the idea of cooperative marketing. They voluntarily deliver their cotton from year to year, but all of them could fail to deliver any year, if during the preceding year they had experienced a crop calamity. In such a case, when their private funds were exhausted it would be necessary for them to borrow funds from banks for crop production. They would then no longer be free agents, but would operate under the supervision of the officers of the banks from which the loans had been made.

It is our opinion that ample production credit, coupled with education, will solve the problem of securing baleage. When we speak of education, we are discussing something abstract in nature. We firmly believe, however, that growers as a class must first be convinced that they can obtain higher prices for their commodity through cooperative marketing, and in obtaining a higher price ultimately it is not only fundamental but advisable that they accept a smaller amount as an initial loan on their cotton, rather than the full proceeds from an outright sale. Not until growers as a class become educated to that principle will they turn to cooperative marketing. It will take a long time, in fact many years, to accomplish the task. But those of us who are in cooperative marketing should not become discouraged because producers cannot visualize the benefits to be derived through the system of marketing we are endeavoring to establish. Growers as a class are not educated. Many of them are grossly ignorant and, consequently, they are suspicious. Independent merchants, knowing this, are constantly working on their credulity. For that reason it will take a long time for the producer fully to understand and appreciate the fact that cooperative marketing leaders are working for him and not, as has been ineptly said, "on him."

The mistakes made by many cooperative associations have set back the cause five, ten, and possibly twenty years. When a cooperative marketing association, through mismanagement, has been forced to liquidate, it has shaken the confidence of growers not only in a particular section but throughout the country. The only thing that saved cooperative marketing of cotton from being an absolutely discarded theory about a year ago, when state associations were badly involved, is the fact that the Farm Board took charge of the situation, reorganized the associations and made loans to them in order to keep them out of bankruptcy.

Costs

The matter of costs has been and always will be a serious obstacle to cooperative marketing. In the first place, sound accounting methods must be used to guarantee accuracy and satisfactory results. Few, if any, growers understand or even have the slightest conception of the accounting problem involved in a cooperative marketing association. Few of them are able or willing to make a fair comparison of the cost of selling cotton through an association and through an independent merchant.

There are certain inherent costs which are inevitable in marketing cotton, but the grower is reluctant to take such expenses into consideration in a cost analysis. He does not readily understand that some costs are necessary and must be calculated in any form of marketing of cotton. For instance, a grower will seldom admit that the cost of insurance is essential, regardless of whether the association has his cotton insured or the grower assumes the hazard. Warehouse charges are identical to growers both in and out of the associations, and yet some growers include the charge in calculating operating costs when their cotton is sold by an association and exclude it when their cotton is sold on the outside. Freight charges for concentration are the same to all growers, but planters have argued with us that charges for concentration were direct charges by the Association, which were not included in costs when their cotton was sold to an independent shipper. They will take such a position when we all know that cotton must bear the expense incident to concentration.

And so it is in all matters of costs. If the necessary expenses incident to marketing through cooperative associations were given a fair and impartial comparison, there is no reason in the world why the cost of selling under this system should not compare favorably with costs accruing from sales on the outside. Every association should be fair and meticulous in informing its members in the matter of expenses. Costs should be itemized. There should be no cheap cuts or sharp practices in making up balance sheets. Unless cooperative associations are able to operate efficiently, economically, and within their revenues, there is absolutely no justification for their existence.

Within the past three months our organization has gone through a complete and extremely rigid economic adjustment. Normally the annual sales value of our commodity is twenty to twenty-five million dollars. Early this fall it was apparent that the sales value of our commodity this year would not exceed fif-

teen million dollars. It was evident to those of us charged with the management of the Association that a drastic reduction in expenses was necessary, if we were to operate within our revenue. The officers worked night after night and spent many days in deliberation and compiled many figures. We finally arrived at a conclusion which was embodied in definite recommendations to our Board of Directors. In our endeavor to work out effective and equitable means of reduction, our foremost thought was that our Association must be operated within its revenue. Our average cost of operation for the past nine years has been 1½ per cent. Our contract allows a 3 per cent deduction for expenses and reserves. After the adjustment was completed, our accounting department estimated that costs this year would be 2¼ per cent, which will be the greatest percentage we have had during the life of our Association. At the the same time, the value of our commodity is only 50 per cent of normal, so that an increase in percentage of costs is inevitable. Should we find within the next few months that our calculations were not correct or that we have misjudged the situation, we shall without hesitation further reduce our operating costs to come within our estimated revenue.

Sales

The matter of sales is probably more easily solved than any other major activity of an association. Much has been written on the subject; many theories have been advanced; and many ideas have been promulgated. But, after all, the sales plan which has succeeded and which will always succeed is the one that goes direct to the consumer and offers him the greatest service. Each year our Association sells more than 95 per cent of its commodity direct to mills. We offer our cotton in such quantity and for such deliveries as the customer may require. We will meet any legitimate competition or any sound business practice. Our selling agents have instructions to meet the best legitimate competition where price is concerned. Just as long as a cooperative marketing association is willing to meet high-grade competition on a sound business basis, that association is assured of a full volume of contracts from consumers.

From a mill's point of view an association's contract is in many ways superior to the contract of a merchant. An association has on hand the actual commodity which is being bought and sold. In most instances a merchant makes a sale and then buys the commodity. If he has difficulty in obtaining the exact quality

sold, a cash settlement must follow for any differences. While this method protects the mill from a financial loss, it has in many instances created a great deal of dissatisfaction from a manufacturing standpoint, for mills buy cotton to manufacture and not to merchandise. In the second place, the large quantity of cotton assembled by associations makes it possible for a classer to select a more uniform quality for shipment than is possible when small lots are bought by shippers and later assembled for delivery on contract. Those two factors, one of having the actual commodity on hand and the other of having a large quantity from which to make selection, have given the cooperative associations a decided advantage over the individual shipper.

It has been our experience that direct sales to mills should be made through brokers or intermediaries at a stipulated commission. The markets for staple cotton are so widely scattered and the demand varies to such an extent, not only from month to month but from season to season, that we find it more practicable to sell through brokers than to establish our own selling agencies. A direct selling agency in any large market would entail overhead expenses of at least $25,000 to $50,000 annually. It therefore follows that unless a full volume of business is done, such a selling expense would be prohibitive. The time will come, after the associations can depend upon large and constant annual baleage, when it may be advisable for them to establish selling agencies; but until such a time arrives, we are unreservedly of the opinion that our present method of distribution, through brokers, is more advisable.

Values

The greatest of all difficulties is to merchandise a commodity at a price which not only represents full value, but which ultimately will be profitable to growers as a class. The question arises, "Is this possible?" It is from the Farm Board that we hope the answer may be furnished. For many years in the agricultural sections, particularly in the cotton states, the price of the commodity has not justified the costs incident to production. Our lands are heavily mortgaged—probably ninety per cent are in that class. In the future unless we can obtain for our cotton a price that is higher, relatively, than that which we have obtained in the past, a general shrinkage in production is inevitable; and if means for either reducing costs or increasing value are not evolved, our national production will begin a long, though slow, decline.

When the Farm Board was created, Congress made no regulations as to how it should function. It was given broad powers and ample money, but no suggestions for operating were offered, except that it should work through cooperative marketing associations. Something over a year ago, after the creation of the Farm Board, I wrote a statement entitled "A Definite Plan of Operation Suggested for the American Cotton Cooperative Association." The first sentence of the summary is, "Fundamentally the problem is one of stabilization." It is the one sentence in the entire paper that I still maintain is sound and is the basis on which help should be rendered.

Soon after the creation of the Farm Board I was in Washington with other officers of our Association. At that time the Board would not discuss or even consider the question of stabilization, contending that the problem was one of marketing and that through a centralized selling agency the solution could and would be found. Within a year from that time conditions had changed so completely that a stabilization corporation was formed not only for cotton but for wheat as well. The cotton stabilization corporation was forced to take over approximately 1,300,000 bales of the American surplus. When this was done the government launched a stabilization operation that it will take years to complete. I think their action was entirely proper. In fact it was the only way in which to prevent demoralization in the cotton industry.

Before the details of taking over and financing such a vast amount of cotton had been completed, the current crop was on the market and its problem had to be dealt with. There was practically no time in which to consider and formulate plans for operation. The course agreed upon was arrived at, in my opinion, through sheer expediency. Yet, I firmly believe the Farm Board has found a solution, for this year, to a problem that would have baffled the best minds in the trade. The price of cotton had declined from 19¢ a pound in August, 1929 to 12¢ a pound in August, 1930. This drastic decline brought the cotton grower face to face with insolvency. The Farm Board realized that if the current crop were marketed at 11¢ to 12¢ a pound, the proceeds would not repay the money borrowed to produce the crop, to say nothing of interest, insurance, taxes, over-head, and other expenses incident to production. Something had to be done and it had to be done quickly. The Farm Board then authorized cooperative associations to sell at the market price all cotton delivered to

them and to replace such sales with future contracts. Many people viewed such a program as an enormous speculation sponsored by the Farm Board. The associations and the Farm Board have been severely criticized for the plan which was agreed upon and immediately put into effect.

Our Association was the last to adopt the policy, though we had been the first to give it consideration. At the September meeting of our Board of Directors, when it is customary to agree upon a plan of operation for the ensuing year, the management explained in detail the problems with which we were confronted in marketing the 1930 crop. We had more than an average carry-over. The estimated production was above an average for the Mississippi Delta. Demand was poor. Fine goods mills were running on short time. Night work had been eliminated. There was no hope for normal consumption, and yet we had more than a normal supply. Cotton was selling below the cost of production. It was the thought of the management that the low prices ruling would stimulate demand and eventually increase consumption. We went to our Board of Directors with the definite recommendation that we sell our staple cotton at the market price, making sales as rapidly as the trade would absorb our cotton, and just as rapidly as the price was fixed on sales to buy futures off-setting such fixed sales. The Farm Board agreed to advance us sufficient money for the operation and gave us a commitment for three years. Our commitment with the Board is such that we can actually buy outright and pay for approximately 100,000 bales of contract cotton. We recommended to our Board of Directors that the purchase of contracts would be sound up to 100,000 bales. We believed that the amount of funds advanced by the Board, together with their three year commitment, safeguarded the two hazards that usually spell disaster in a future market transaction; namely, the lack of ample funds and sufficient time in which to bring the operation to the desired conclusion. We have followed this program consistently since the opening of the season. We have sold our cotton as rapidly as mills would buy it, and we have replaced every spot sale with a contract in the New York market. It is our purpose to carry these contracts until the present economic disturbance has been quieted and general business conditions have been adjusted, and until, as one of our former presidents said, we are again "back to normalcy."

The plan of selling spot cotton and buying future contracts makes it possible for mills to avail themselves of the present low

prices of cotton. A reduction in price has always brought about an increase in consumption. At cheap prices cotton can be used for many purposes that would be prohibitive at normal value. Outright sales eliminate all subsequent costs of every nature. At the same time, the Association, with its future contracts, retains every advantage of holding spot cotton for higher prices, with none of the disadvantages, such as loss in weight, carrying charges, and so forth. When an oversupply occurs, a correction in price takes place only through the use of the surplus. Our present plan of operation not only permits but aids increased consumption. At the same time the future contracts are similar to an insurance policy, guaranteeing the Association that the current low prices for spot cotton will not have to be accepted by the grower as a final sales price for his commodity. When the present depression has passed, when economic conditions have become adjusted, and when the price level has returned to its normal relationship, these future contracts will then be closed and the profit resulting therefrom will be distributed to our members.

There is one other decided advantage in this method of operation; that is, the future contracts can be closed almost simultaneously with the decision that a satisfactory price level has been reached, while if the actual cotton were held, it would take a long time after an advance in the market to merchandise any large amount of spot cotton. In our own case, we rarely sell more than fifteen to twenty thousand bales a month. As we handle 200,000 to 250,000 bales annually, it would take a year to actually sell and collect for our cotton, after we had decided that the price level had attained a satisfactory liquidating value.

We have given a great deal of thought to the policy inaugurated by the Farm Board, which we are following, and we cannot view the ultimate results in any but a favorable light. We realize there are no man-made plans which cannot go awry. No matter how perfect the method or how accurate the details, there is always something that can upset the plan. We are, however, firmly convinced that what is being done by the cooperatives at present is economically sound and will eventually lead to a satisfactory conclusion. It does not upset the law of supply and demand that has been so much harped upon by all economists and writers. It is not lifting oneself by one's boot straps. In fact it is the reverse. It allows the law of supply and demand to control and regulate prices. It allows every law of fundamental economics to function in a normal way. At the same time, it

offers to the producer, through cooperative associations, a means of protection against a level of prices which, if accepted as a final price, would mean insolvency.

We have disagreed with the Farm Board more than once. We have not always been in accord with everything done by the Board, but we want at this time to go on record as absolutely and unalterably approving the plan under which the Board has agreed for cooperative associations to function this year. We believe they have found a solution to this season's complex problem. We do not think the present plan would be a solution under normal conditions. While it has our hearty approval and endorsement this year, we would be equally as vigorous in protesting against such a policy in a normal year as we are in favor of it this season. Under normal conditions it would lead to speculation and would invariably bring about the same situation that occurred with certain cooperatives a year ago, which was without question brought about wholly by a speculative and not a merchandising program.

In conclusion, I wish to say that all of the problems can never be solved. Like all other lines of commerce, as rapidly as a solution is found for one problem, another presents itself and must be given attention. The best we can hope for is constant vigilance on the part of those employed in cooperative marketing. We must be ever mindful that new difficulties will be encountered, which must be mastered. The task can never be complete, and for that reason cooperative marketing will always require the thoughtful consideration of all students interested in the economic development and welfare of this country. Cooperative marketing will always be subjected to criticism and attack. The best defense is honest, conscientious, and efficient effort to solve in the most modern and practical way each problem as it is presented.

MIDDLEMEN'S MARGINS

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The article on Middlemen's Margins by Henry I. Richards in the October issue is a very interesting one.[1] The author's final conclusion is that the evidence presented by Dr. Warren and Dr. Pearson in their recent bulletin, "Interrelationships of Supply and Price," does not warrant the conclusion that relatively high costs of distribution have been the most serious single factor in causing the agricultural depression or even that they have been a very important factor.

Although Mr. Richards emphasizes in his discussion the relation between margin changes and farm incomes, his criticisms are directed at practically the entire contents of the aforementioned bulletin. He questions the method of measuring margin changes, the assignment of wages as the principal cause of increased margins, the relationships between margins and size of crops, the increased violence in the fluctuations of farm prices, and the causes of changes in farm price fluctuations.

An appraisal of Mr. Richards' analysis is important, for, as he states in his article, it "demonstrates why many economists do not accept the above explanation of this agricultural depression."

Causes of Margin Changes

Mr. Richards agrees with Dr. Warren and Dr. Pearson that margins have been higher since 1920 than before the War, that wages have been high relative to other prices in the deflationary period, and that wages are the most important cost factor in determining handling charges. He disagrees with them in the belief that margins have been high because of high wages. Instead, he believes that "although wages paid by distributors are now higher, it may be that this has been offset in large part by an increase in the efficiency of distributive agencies" and that "specialization in agriculture, concentration of population in particular localities, and the demands of consumers for more credit, more delivery service, and more processing and packaging of food products, have probably caused such an increase."

The significance of a proper assignment of causal influences is reflected in the following statement:

[1] "Middlemen's Margins as a Cause of the Agricultural Depression," Richards, Henry I, Journal of Farm Economics, October, 1930, pp. 523-551.

"In general, it may be said that changes in the level of charges for the same distributive services directly affect the incomes and prosperity of farmers; while changes in distributive charges caused by changes in the quantity of distributive services do not."

With this hypothesis, Mr. Richards attempts to show that increased margins since 1920 have been largely a result of factors requiring a larger amount of distributive service in the country as a whole. This, in turn, leads him to the conclusion that the incomes and prosperity of farmers have not been affected by such changes.

Mr. Richards begins his proof with an assumption that margin changes between two specific distributing points represent changes due to varying costs for the same service while margin changes for the country as a whole include changes due both to fluctuating costs for the same service and to changes in the total quantity of service required. Hence, differences between these two measurements of changes are assumed to be due entirely to changes in the quantity of service.

Unfortunately, the separation of causal influences is not so simple. It is inconceivable that changes in the quantity of such services as delivery, extension of credit, and the processing and packaging of food products should not affect margins on commodities moving from one specific place to another. If consumers in New York City, for example, order the delivery of their potatoes in ten-pound cartons and pay the bill at some later date, the increased cost is no less for potatoes from Batavia, New York, or Riverhead, Long Island, than for potatoes from any other place. The subtraction of one margin change from another gives neither the net influence of one causal factor nor that of another.

Furthermore, the fact that the United States farm prices, the United States wholesale prices, and the United States retail prices of each and every product are averages of prices at specific points is important. In demonstrating that the spread between pairs of averages has increased materially while the differences between the individual items making up those averages have remained unchanged, Mr. Richards has come very close to proving what is algebraically impossible. It goes without saying that if the margin between the Batavia, New York, farm price of potatoes and the New York City retail price, for example, has increased *less* rapidly than the margin between the United States

farm and retail prices, the margin between two other equally specific distributing points must have increased *more* rapidly.

Most, if not all, of the discrepancies which Mr. Richards found between margin changes for the country as a whole and for selected pairs of distributing points are due to his methods of measuring margin changes. Disfavoring the use of index numbers, he deflated actual margins between pairs of distributing points for a number of farm products, using the wholesale price index of all commodities as the "deflator." He then compared these *deflated* margins, expressed in dollars and cents, with the Cornell *undeflated* index of margins for the corresponding products. In all cases, the discrepancies were, of course, very great.

Whatever method of measuring margins is used, it is important that two series be made comparable before one is subtracted from the other. Although Mr. Richards may have considered this fact in his discussion, the casual reader obtained a greatly exaggerated impression of the differences in margin changes from his tabular analyses.

Moreover, the deflationary process misrepresents the data. Wholesale prices, being higher than prices producers receive and lower than prices consumers pay, contain a portion of the distributive margin. What is more important, they contain a large portion of any changes in margins, particularly increases due to increased costs for the same distributive services. Designed to remove from a margin series the influence of changes in the value of money, the deflationary process removes, in addition, a portion of the factor which the deflated series was designed to measure, namely, increased costs. In addition, a wholesale price index lacks the generally accepted qualifications of a good deflator of either farm or retail prices, and consequently of their differences.

A much more satisfactory method of measuring margin changes is the expression of the price of a particular product at one point in the distributive system as a percentage of the price *of the same product* at some other point in the system. These price ratios, or percentages, can then be made comparable for all series by calculating the per cent changes in the ratios from one period of time to another. A number of these ratios and per cent changes are given in Table 1.

The pre-war five-year period, 1910-14, meets most satisfactorily the qualifications of a comparatively recent, so-called "normal" period. The following five years were characterized

TABLE 1.—RATIOS OF THE WHOLESALE AND RETAIL PRICES OF IMPORTANT AGRICULTURAL PRODUCTS TO THE FARM PRICES DURING THE THREE FIVE-YEAR PERIODS, 1910–14, 1915–19, AND 1920–24*

Product and prices	Ratio of prices, in per cent			Per cent change in ratio from		
	1910–14	1915–19	1920–24	1910–14 to 1915–19	1910–14 to 1920–24	1915–19 to 1920–24
Potatoes						
New York City wholesale price to Batavia, N. Y., farm price[1]	123.5	118.7	149.2	96.1	120.8	125.7
New York City retail price to Batavia, N. Y., farm price[1]	266.9	189.2	323.2	70.9	121.1	170.8
Cabbage						
New York City wholesale price to Little York, N. Y., farm price[2]	135.6	106.7	143.2	78.7	105.6	134.2
Wheat						
Price of Chicago, No. 2 Red Winter to Kansas farm price[3]	117.3	111.2	123.1	94.8	104.9	110.7
New York City retail price (flour) to Kansas farm price[4]	—	159.5	211.1	—	—	132.4
New York City retail price (bread) to Kansas farm price[4]	—	297.0	505.1	—	—	170.1
U. S. retail price (bread) to U. S. farm price[5]	—	311.9	461.8	—	—	148.1
Corn						
Price of Chicago No. 3 Yellow to Iowa farm price[6]	116.4	117.6	121.0	101.0	104.0	102.9
Hogs						
U. S. retail price (pork products) to U. S. farm price[7]	195.5	186.6	268.4	95.4	137.3	143.8
Chicago wholesale price to Iowa farm price[8]	108.4	107.0	109.0	98.7	100.6	101.9
Chicago retail price (pork products) to Iowa farm price[8]	—	259.0	394.2	—	—	152.2
Beef Cattle						
U. S. retail price (beef products) to U. S. farm price[9]	192.4	188.2	263.3	97.8	136.8	139.9
Chicago wholesale price to Iowa farm price[10]	122.1	122.5	127.2	100.3	104.2	103.8
Chicago retail price (beef products) to Iowa farm price[10]	—	272.5	411.2	—	—	150.9

* Sources of data:
"Middlemen's Margins as a Cause of the Agricultural Depression," Richards, Henry I., Journal of Farm Economics, October, 1930.
[1] Table 2, page 529.
[3] Table 4, page 531.
[6] Table 3, page 530.
[8] Table 5, page 533.
[10] Table 6, page 534.
"Interrelationships of Supply and Price," Warren, G. F., and Pearson, F. A., Cornell Bulletin 466, March, 1928.
[2] Table 30, page 35.
[4] Tables 70 and 71, page 60.
[7] Table 98, page 77 and table 100, page 78.
[9] Table 100, page 89 and table 112, page 90.
Yearbook, United States Department of Agriculture, 1930.
[5] Table 19, page 611 and table 26, page 615.

by monetary inflation, followed by a period of monetary deflation.

In the pre-war period, 1910-14, the average wholesale price of potatoes in New York City was 124 per cent of the farm price at Batavia, New York. During the war and monetary inflation, this ratio fell to 119, and with monetary deflation, advanced to 149 per cent. The changes in the ratio were a decrease of 4 per cent from pre-war to inflation, an increase of 21 per cent from pre-war to deflation, and an increase of 26 per cent from inflation to deflation. In like manner, the ratio of the New York City retail price of potatoes to the Batavia farm price decreased from 267 to 189 per cent and then advanced to 323 per cent. The per

cent changes in this ratio were a decrease of 29 from pre-war to inflation, an increase of 21 from pre-war to deflation, and an increase of 71 from inflation to deflation.

Before the war, the price of No. 2 red winter wheat at Chicago averaged 117 per cent of the farm price in Kansas. During the war, this ratio fell to 111 per cent and with monetary deflation, following the war, advanced to 123 per cent. The changes in the ratio are a 5 per cent decline from pre-war to inflation, a 5 per cent advance from pre-war to deflation, and an 11 per cent advance from inflation to deflation.

Similar results were obtained for most of the distributive margins analyzed by Mr. Richards. During the five-year period, 1915-19, margins were lower than during the five years immediately preceding. They were higher during the post-war period than during either of the other two periods. Moreover, the changes in margins between specific distributing points were not materially different from those between the less definite areas.

As referred to above, among the increased services cited by Mr. Richards were the demands of consumers for more delivery and credit. Similarly, among his evidences of increased efficiency in the distributive system is the development of chain store methods. How does he reconcile these two statements? Chain stores, for the most part, are either of the "Cash and Carry" type or of "Self-Service" type. In the latter, the customer not only pays cash and carries his own purchases but he takes a basket, helps himself from the shelves, and pays the cashier at a turnstile on the way out. The people who buy at chain stores receive less rather than more service but they save the deliveryman's wages which have been abnormally high by buying at lower prices and carrying their own purchases.

As evidence of the increasing concentration of population in particular localities, the fact that large cities increased 25.7 per cent in population from 1910 to 1920 compared with 11 per cent for the rest of the United States was cited. The statement was intended as a partial explanation of increased margins. As a matter of fact, distributive margins were actually *lower* in the last half of this decade than in the first (Table 1).

If abnormally high margins during the monetary deflation period, 1920-24, were due primarily to increases in the amount of distributive service required, resulting from specialization in agriculture, concentration of population in particular localities, and similar phenomena, why were margins abnormally low in

the five years immediately preceding (period of monetary inflation)? Is efficiency of distributive agencies highly correlated with the value of money? Do consumers demand more service when the cost of that service is abnormally high than when it is abnormally low?

In general, less rather than more of a particular good or service is demanded when the price of that good or service is high relative to the prices of other goods and services. Changes in the quantity of distributive service tend to offset rather than add to changes in margins resulting from changing costs. It was not a mere coincidence that chain stores developed most rapidly when labor costs were high and the margin saved by consumers in rendering some of their own distributive service was exceptionally great.

Relation of Size of Crops to Margins

Dr. Warren and Dr. Pearson concluded from their analysis that for most farm products the distributive margin is higher when the crop is large and the price is low than when the crop is small and the price is high. In other words, the smaller the quantity of the product which farmers handle the larger is the portion of the consumers' dollar which they receive in payment.

Mr. Richards objects to this conclusion because the size of the local crop was not considered in the analysis, margins were not deflated, and because "there may be some question as to the method of separating years of large and small crop production."

The first of these objections implies a negative correlation between the size of the local crop and the size of the total crop; the second implies a negative correlation between the size of crops and the value of money; and the third was neither explained nor discussed in the article.

As regards the relation of the size of the local crop and margins, as compared with the size of the total crop, it seems much more probable that the degree of association should be greater than that the slope of the regression line should be reversed.

Unfortunately, very little local production data are available for a series of years with which adequately to answer Mr. Richards' criticism. The results which could reasonably be expected from narrowing the production record to that of some small area can, however, be gained in the case of potatoes, by comparing the relation between the size of the New York State crop

and margins with the relation between the size of the United States crop and margins.

During the seventeen years 1910-26, the production of potatoes in New York State fluctuated between 22 and 53 billion bushels (Table 2). In the United States, the production varied from

TABLE 2.—POTATO PRODUCTION IN THE UNITED STATES AND IN NEW YORK STATE, AND THE RATIO OF THE NEW YORK CITY RETAIL PRICE OF POTATOES TO THE FARM PRICE AT BATAVIA, NEW YORK, 1910–1926

Year	United States potato production			New York State potato production			Potato prices (dollars per bu.)		New York City retail price of potatoes, in per cent of the Batavia farm price
	Actual production in bu. (000,000)[1]	Ordinate of linear trend	Actual production in per cent of trend	Actual production in bu. (000,000)[2]	Ordinate of linear trend	Actual production in per cent of trend	Batavia N. Y. farm[3]	N. Y. City retail[3]	
1910	349	355.6	98	40.3	35.5	113	.39	1.38	354
1911	293	357.9	82	27.8	35.3	79	1.01	2.04	202
1912	421	360.2	117	38.2	35.2	109	.47	1.44	306
1913	332	362.5	92	26.6	35.0	76	.65	1.50	231
1914	410	364.8	112	53.2	34.8	153	.29	1.14	393
1915	360	367.1	98	22.0	34.7	63	.89	1.68	189
1916	287	369.4	78	22.4	34.5	65	2.32	3.36	145
1917	442	371.7	119	38.0	34.4	110	.83	2.22	267
1918	412	374.0	110	37.2	34.2	109	1.03	2.52	245
1919	323	376.3	86	33.8	34.0	99	2.35	4.26	181
1920	403	378.6	106	40.6	33.8	120	.55	2.10	382
1921	362	380.9	95	34.0	33.7	101	.98	2.46	251
1922	453	383.2	118	37.4	33.5	112	.60	1.92	320
1923	416	385.5	108	39.7	33.4	119	.71	2.22	313
1924	420	387.8	108	42.0	33.2	127	.39	1.74	446
1925	321	390.1	82	23.2	33.0	70	2.16	3.66	169
1926	354	392.4	90	29.0	32.9	88	1.03	2.64	256

[1] Yearbook, United States Department of Agriculture, 1930, page 765.
[2] Agricultural Statistics for New York State, 1928, Bulletin 226, Department of Agriculture and Markets, New York State, Table 52, page 112, May, 1929.
[3] "Middlemen's Margins as a Cause of the Agricultural Depression," Richards, Henry I., Journal of Farm Economics, October, 1930, table 2, page 529.

287 to 453 million bushels. The straight line trend in production was downward in New York at approximately the rate of 165 thousand bushels per year and upward in the United States at the rate of 2.3 million bushels per year.

In measuring the size of the potato crop in each area, the actual production figure was divided by the corresponding ordinate of linear trend and expressed as a percentage. Distributive margins were measured by the method described earlier in this article, that is, the retail price of potatoes in New York was expressed as a percentage of the farm price at Batavia, New York.

The production of potatoes in New York State and in the United States, from 1910 to 1926 inclusive, and the ratio of the retail price of potatoes in New York City to the Batavia farm price were plotted as time series and are presented in Figure 1. With but two exceptions, both of minor significance, the directions of the changes from year to year in all three series are identical, indicating a positive association between the variables.

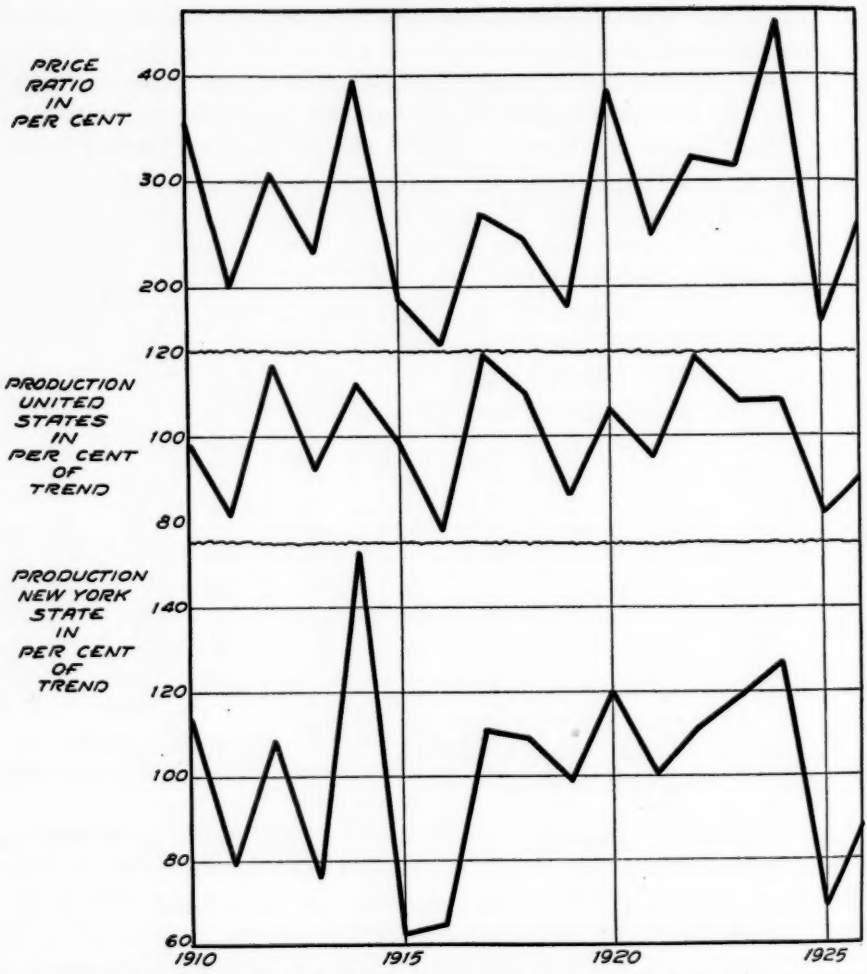

FIGURE 1.—Potato Production in the United States and in New York State, in Per Cent of Trend, and the Ratio of the New York City Retail Price to the Batavia, New York Farm Price of Potatoes, in Per Cent, 1910-1926.

The direction of the changes, from year to year, in each of these series is highly correlated with the changes in each of the other series.

In order to picture more adequately the relative degree of association between the price ratios and the two production series, the two sets of variables were plotted as scatter diagrams (Figures 2 and 3). In each case, the price ratio series was treated as the dependent variable. The linear correlation coefficients were then calculated and the regression lines plotted.

The linear correlation between the size of the United States crop of potatoes and the ratio of the New York City retail price to the Batavia farm price is +0.682. The substitution of the New York State crop for the United States crop gives a correlation of +0.863. The difference is significant and both correlations are sufficiently high to warrant more than a statement of "possible" relationships.

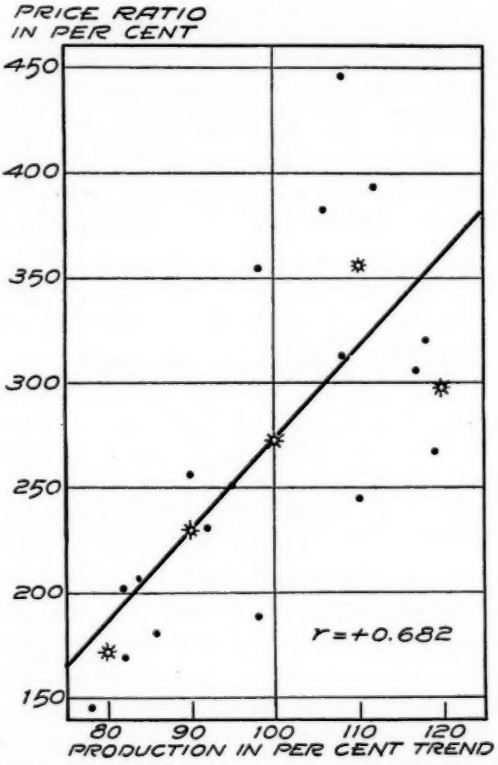

FIGURE 2.—Relation of the Ratio of the New York City Retail Price of Potatoes to the Batavia, New York Farm Price to the Size of the United States Potato Crop, 1910-1926.

The margin between the Batavia farm price of potatoes and the New York City retail price was nearly twice as great when the production of potatoes in the United States was 20 per cent above normal as when it was 20 per cent below normal.

The use of both a more flexible measure of the trends in potato production and of the curvilinear correlation methods increases somewhat the degree of relationship between these factors. Moreover, as indicated by the means of arrays, the curvilinear relationship is much greater in the case of the New York State crop

than in the case of the United States crop. This fact is important for it means a still larger difference between the two relationships than the linear coefficients indicate.

Although it is not absolutely certain that similar results would be obtained from other areas or for other products, it is inconceivable that the relation of the size of the local crop of any product to margins should be as inconsistent with the relation of the size of the total crop as Mr. Richards implies.

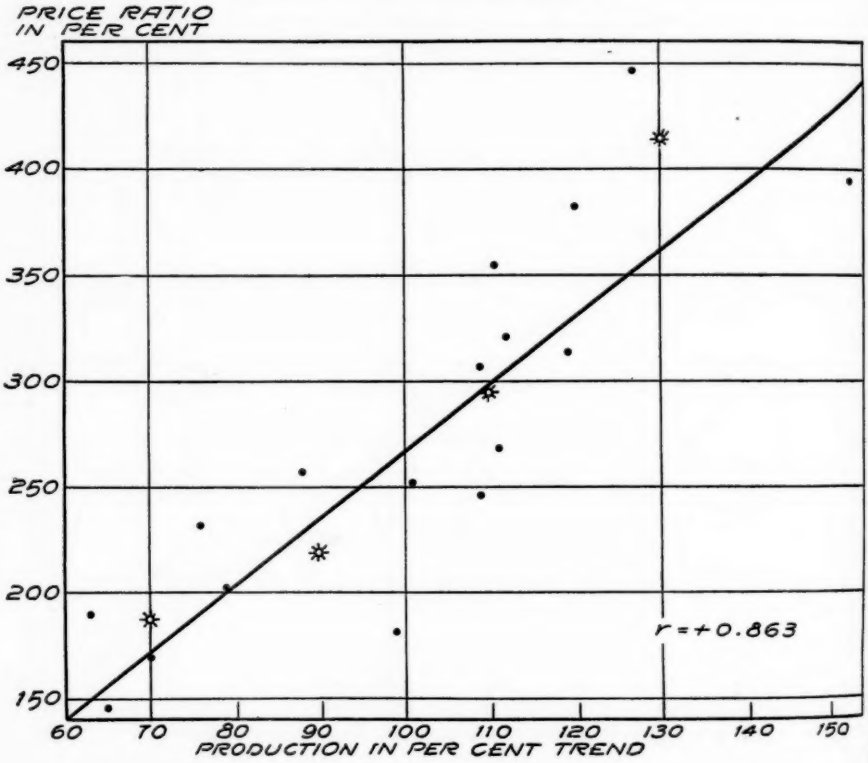

FIGURE 3.—Relation of the Ratio of the New York City Retail Price of Potatoes to the Batavia, New York Farm Price to the Size of the New York State Potato Crop, 1910-1926.

The size of the distributive margin on potatoes shipped from Batavia to New York City is highly correlated with the size of the potato crop in New York State.

The effect of deflating margins is shown in this same analysis since the calculation of the price ratios eliminated the influence of fluctuations in the value of money. Furthermore the conclusion reached by Mr. Richards after deflating the margins for

potatoes was as follows: "Again it is necessary to emphasize the fact that such results merely indicate possible relationships. Nothing has been said of the relation of the size of the crop around Batavia, New York, to the size of the United States crop or the influence of the size of the crop around Batavia on the above margins."

Fluctuation of Farm Prices

As a final criticism of the bulletin, "Interrelationships of Supply and Price," Mr. Richards states that fluctuations in farm prices of potatoes and corn are more than accounted for by fluctuations in retail prices and that very little evidence was presented to show that farm prices now fluctuate more violently than before the war. He suggests a much more thorough analysis to prove the contentions that farm prices as a whole now fluctuate more than before the war or that an increase in margin between farm and retail prices has been the primary cause of any such increase in farm price fluctuations.

It is quite as essential that any analysis be "accurate" as well as "thorough." In Table 13 on page 547 of Mr. Richards' article, data were presented to show that the *percentage* increase in the fluctuation of retail prices of potatoes from 1895-1915 to 1921-1925 was over four times as great as the percentage increase in the fluctuation of farm prices. An increase of 1,033 per cent in the fluctuation of retail prices is, indeed, a phenomenal increase. Correctly calculated, however, the increase is only 58 per cent. Similarly corrected the percentage increase in the fluctuation of farm prices was 80 instead of 228, and of wholesale prices, 49, instead of 180.

The error which Mr. Richards made in calculating percentage increases was simply one of using deviations from the assumed normal percentage, 100, instead of using the absolute values, comparable to those used in the construction of the curves from which he took the readings. Had the curves been constructed using price *changes* (both positive and negative) from one time to another, the method used by Mr. Richards would have been quite right. In accordance with the methods used by Dr. Warren and Dr. Pearson, it is essential that readings from the curves be treated as percentages *of* normal rather than as percentages *above* or *below* normal.

Table 13, as corrected for calculations of percentages, is here presented as Table 3. The conclusions to be drawn from these

corrected values are quite different from those pictured by Mr. Richards. Instead of showing that the increase in the fluctuation of retail prices was nearly five times as great as the increase in the fluctuation of farm prices, the results signify that the relative increase was 58 as compared with 80, or less than three-fourths as much. Furthermore, these results are in accord with the fact which will be demonstrated later in this article that farm prices must inevitably fluctuate more, relative to retail prices, when the distributive margin between the two prices has increased.

The hypothetical example presented by Mr. Richards in Table 14 on page 548 was intended to show that the increased fluctuation of retail prices of potatoes accounted for more than the increased fluctuation of farm prices. Such a conclusion was entirely unjustified. It would be just as logical to say that the 94-cent margin was entirely responsible.

The conclusion to be drawn from the data in Table 14 on page 548 of Mr. Richards' article is that with a normal retail price of $1.50 and a constant distributive margin of 94 cents, every change of 10 per cent in the retail price will be accompanied by a change of approximately 27 per cent in the farm price. It does not follow therefrom that the change in the retail price is entirely responsible for the change in the farm price. It is quite as essential in obtaining these results for the normal retail price to be $1.50, for the normal retail price to remain constant, for the distributive margin to be 94 cents, and for the distributive margin to remain constant at that figure. Changes in any one of these factors will lead to different results, the fluctuations in retail prices remaining the same.

TABLE 3.—PER CENT THAT POTATO PRICES WERE OF NORMAL WHEN THE UNITED STATES POTATO CROP WAS 80 PER CENT OF NORMAL

Locality	1895–1915	1921–1925	Differences in percentages	Percentage increase
Farm Prices, Batavia, New York.....	154*	277	123	80
Wholesale Prices, New York City.....	138	206	68	49
Retail Prices, New York City.....	106	168	62	58

* 1897–1915.

Moreover, the important fact is that fluctuations in farm prices increased *relative* to fluctuations in retail prices, in both absolute and percentage terms. In the case of potatoes (Table 3) the percentage increase in the fluctuation of farm prices at Batavia, New York, from 1895-1915 to 1921-1925 was 80 compared with a percentage increase of only 58 in the fluctuation of the retail prices in New York City.

The difference in these percentages is due entirely to a larger

margin between the farm and retail prices of potatoes during the 1921-1925 period than during the 1895-1915 period. No other factor can possibly account for this difference. Increased fluctuations in retail prices, in themselves, can account for no more than a proportional increase in the fluctuations of farm prices. This fact is illustrated in Table 4.

TABLE 4.—EFFECT OF THE SIZE OF THE DISTRIBUTIVE MARGIN ON THE VIOLENCE WITH WHICH FARM PRICES FLUCTUATE RELATIVE TO RETAIL PRICES

"Normal" retail price (dollars) per bu.)	Per cent changes in retail price	Per cent changes in farm price with a constant margin of				
		0 cents per bu.	20 cents per bu.	40 cents per bu.	60 cents per bu.	80 cents per bu.
1.00	0	0	0	0	0	0
1.00	10	10	12.5	16.7	25	50
1.00	20	20	25.0	33.3	50	100
1.00	30	30	37.5	50.0	75	150
1.00	40	40	50.0	66.7	100	200
1.00	50	50	62.5	83.3	125	250
1.00	60	60	75.0	100.0	150	300
1.00	70	70	87.5	116.7	175	350
1.00	80	80	100.0	133.3	200	400
1.00	90	90	112.5	150.0	225	450

With a retail price of one dollar per bushel for any product and no margin whatever, the farm price would, of course, fluctuate directly with the retail price. Moreover, with a constant margin of any size, changes in the retail price of a product would be accompanied by proportional changes in the farm price. If the retail price, for example, fluctuates 20 per cent from the normal of one dollar per bushel instead of 10 per cent, and the constant distributive margin is 20 cents, the increase in the fluctuations of the farm price will be from 12.5 per cent to 25 per cent. In the case of both prices the percentage increase in the fluctuations is 100 per cent. Similarly, with a distributive margin of 40, 60, or 80 cents, a doubling in the violence with which the retail price fluctuates is accompanied by a doubling in the violence with which the farm price fluctuates.

If, on the other hand, the size of the margin increases, as it did on most farm products during the deflation period, the fluctuations in the farm price become more violent with given changes in the retail price. With a retail price of one dollar per bushel for any product and a distributive margin of 20 cents, a change of 10 per cent in the retail price is associated with a 12.5 per cent change in the farm price. With a distributive margin of 80 cents, the same change of 10 per cent in the retail price results in a change of 50 per cent in the farm price. Increases in the violence with which farm prices fluctuate, relative to retail prices, are due entirely to larger distributive margins.

THE WORK OF THE INTER-STATE EARLY POTATO COMMITTEE

A. E. Mercker
U. S. Department of Agriculture

The extremely low and demoralized early potato market in 1928 caused a great deal of distress among the early potato growers and their selling agencies. It so happened that a member of one of the leading sales organizations in Virginia spent a few days at the same resort as one of the Virginia State Senators and Mr. Wm. E. Carson, chairman of the Virginia Commission on Conservation and Development. The potato troubles, their causes, and problems surrounding their solution were freely discussed and Mr. Carson was prevailed upon to make an effort to remedy the situation. This led Mr. Carson to have his organization make some investigation of the potato situation. The results indicated that the most hopeful sign for relief would be in a conference of selected representatives of all the agencies touching the early potato industry in the southeast region so that it would be possible to discuss in detail the factors dominating the potato situation, both national and regional, and to determine whether any plan of action could be agreed upon to prevent a recurrence of such bad market conditions. Mr. E. O. Fippin, secretary to the Commission, planned the meeting of all the agencies involved in the production of early potatoes in the southeast. The aim was to bring into the conference potato growers, dealers, members of cooperative organizations, credit agencies, such as bankers, fertilizer dealers, land leasing agencies and other companies furnishing supplies; representatives of the State Colleges of Agriculture, Experiment Stations, Extension Service, and of the State and Federal Departments of Agriculture.

The meeting of these agencies was held at Norfolk, Virginia, on November 8-9, 1928. The discussions at the meeting led to formulating a program on which to build some continuing plan of action with the hope of reaching some effective solutions of potato marketing problems, stabilization of potato prices, and the judicious disposal of surpluses. Particular emphasis was laid on the necessity for inter-state cooperation and the coordination of the efforts of all agencies willing to work on these potato problems. It was fully realized that no one producing area could remedy the situation by itself. With this object in view the Inter-State Early Potato Committee was "set up." Its primary func-

tion is that of a steering or advisory committee. The personnel of the committee consists of the Directors of Extension of the states involved, which at first included Maryland, Virginia, and North Carolina. In 1931 Florida, Georgia, and South Carolina have joined in this work. Each Director of Extension had an alternate elected to assist him in this work and this alternate was generally the man in the state government most closely connected with its agricultural marketing problems. There was also elected from each state a potato grower or a potato grower's representative such as the manager of a potato cooperative marketing association. A dealer from each state was also elected to act on this committee. The Federal Department of Agriculture was asked to participate in this work and be represented on the committee. With this object in view the Chief of the Office of Cooperative Extension Work, an Assistant Chief of the Bureau of Agricultural Economics and the specialist in charge of its Division of Fruits and Vegetables, were elected to participate in the work of the committee. Mr. John R. Hutcheson, Director of Extension from Virginia, was elected chairman of the Inter-State Early Potato Committee. The chairman of the committee suggested that it would be necessary to have some one devote all of his time to this work and that it would be necessary for them to hire a secretary to give his full time to the potato situation in the early producing states. This secretary receives his salary and traveling expenses from official sources exclusively and is paid by the Extension Services of the participating states, the Federal Department of Agriculture and one State Department of Agriculture.

When the committee was formed the Virginia Commission of Conservation and Development stepped out of the picture as they felt they should give no further time to helping in the potato situation, except in the initial work connected with the organization set up.

A discussion of the trend of the early potato acreage at the Norfolk meeting indicated that it fluctuated widely from year to year and that increases and decreases in acreage were made frequently in years when they were least justified and since these fluctuations were in a large part due to the lack of adequate information of potato stocks on hand and a lack of knowledge as to the intentions to plant of the early potato growers and of those who financed these growers, and since no effort had been made by the potato marketing agencies to exchange intimate knowledge so

as to coordinate their activities, it was decided to set up sub-committees in each state to act on their particular problems. These sub-committees are:

1. Acreage and Advance Information Committee.
2. Credit Committee.
3. Substitute Crops and Enterprises Committee.
4. Marketing Committee.

The personnel of these sub-committees consists of residents of their respective states interested in the potato industry. They are chiefly potato producers but they also include dealers, supply merchants, members of cooperative marketing organizations, bankers, agricultural statisticians, landlords, specialists of the United States Department of Agriculture, Extension Staffs including County Agents, Vocational Agriculture Teachers, members of Agricultural Experiment Stations, State Colleges, and State Departments of Agriculture. The sub-committees give the Inter-State Committee close contacts with all the interests affected by potato production.

The objectives of the work of the committee are to make the early potato industry permanently profitable to the producer, to secure a regulation of the supply to meet the expected demand, to prevent years of scarcity and years of over-production by furnishing producers and those who finance production with advance information on which to base their potato acreage and to interpret and to explain to the producers the nature and value of crop outlook information.

In order to put the work over an extension mailing list of all the various classes of persons and organizations interested in the potato industry was compiled. This enables special information to be sent to the interested classes when necessary, or available. The list is segregated into divisions of growers, bankers, newspapers, fertilizer manufacturers, dealers and cooperatives, supply merchants and public workers. Through direct contacts with county agents in these early potato producing sections information coming from the Inter-State Committee is given wide publicity through the local press.

After over two years experience we have found out that it is an extremely difficult task to teach growers and those allied to the potato industry to curb the impulses that have motivated their acreage changes in the past. It is extremely difficult to teach the large majority of growers the value, application, and use of federal and state agricultural economic outlook material, intentions

to plant reports and other economic information in the planning of their rotations, and in the adjusting of their acreages, planting operations, growing and marketing of their crops to future prospective demands for these crops. The difficulty of the undertaking is increased by the fact that acreage in the South should not be stabilized at any particular point because the acreage which may be excessive in one year because of a larger supply of old potatoes remaining on hand in the spring may prove to be less than the acreage which can be planted with profit in another year when stocks of old potatoes are known to be smaller. Therefore, the recommendations of the acreage committee vary from year to year. In the execution of the work a program is set up and it is either indorsed or rejected first by the Inter-State Committee and then by the respective separate state committees. So far all programs indorsed by the Inter-State Committee have been further indorsed by the respective state committees.

The acreage problem is, therefore, not to secure a limitation or general and permanent reduction in potato acreage, but to secure such increases and decreases from year to year as are calculated to maintain a volume of production which will insure the grower against an over-production with resultant losses but not so small as to cause the consumer to pay exorbitant prices. To illustrate: On January 1, 1929, commercial stocks were estimated at 125,000,000 bushels which indicated that southern growers should make a drastic cut in potato acreage in 1929. This drastic cut was obtained, but not through any efforts of this committee as the growers received ruinously low prices in 1928 and reacted accordingly. This cut in acreage secured at least fair prices for the crop marketed up through June, 1929, in spite of the fact that the volume of old potatoes shipped to the market during the month of May was unprecedented. In July and August very good prices were obtained for new potatoes. In September, 1929, the members of the Inter-State Committee made suggestions regarding a probable safe acreage for 1930. At that time northern potatoes were bringing very good prices, the supply was relatively low and it was calculated that the merchantable stocks on hand January 1, 1930, would probably be around 85,000,000 bushels. As high prices have, in the past, stimulated increased acreage, the committee thought it advisable to suggest moderate increases in acreage in those southern states that would market their crops not later than the month of June in order to take advantage of the lighter competition from the old crop. Decreases

in acreage were recommended in those sections that marketed their crops in July and August as the supply of new potatoes largely governed the price received. The committee urged farmers and those who financed their crops not to go beyond this acreage but to hold the total below, or close to that planted in 1927 and very materially below that planted in 1928. The following table shows the acreage suggested as safe for 1930 and the probable number of carloads each of these areas would ship:

	Acres 1929	Acres I.E.P. Committee Recommended 1930	Acres Planted 1930	Estimated Carloads 1930	Actual Carloads Shipped 1930
Florida	22,000	28,000	31,000	6,000	4,800
South Carolina	14,000	15,000	16,000	4,000	4,509
North Carolina	25,000	30,000	31,250	7,000	7,355
Virginia:					
Norfolk	10,700	12,000	12,400	3,000	3,756
E. Shore	59,000	56,000	73,300	15,400	17,643
Other	3,900	4,000	4,300	300	275
Maryland	9,000	8,600	10,350	3,000	2,135
TOTALS	143,600	153,600	178,600	38,700	40,473

Increases in acreage were recommended for Florida, South Carolina, and North Carolina and the Norfolk area of Virginia. A five per cent decrease was recommended for the eastern shore of Virginia and Maryland. The total increases recommended amounted to about 7 per cent for the entire region. A twenty-four per cent increase was realized, four-fifths of which increase in acreage was on the eastern shore of Virginia and Maryland where it was the least justified. It was estimated that 38,700 cars of potatoes would probably be shipped from this acreage while in actuality the shipments from this region were 5 per cent greater than the shipments estimated by the committee. If the eastern shore of Virginia had had a normal growing season in 1930 the carlot shipments from the acreage actually planted would have been much greater than the number actually shipped and prices would have been correspondingly lower. It was fully realized that our most difficult problem in 1930 would be the eastern shore of Virginia and Maryland because of the good prices and good yields received in 1929. With this in view 36 growers' outlook meetings were held on the eastern shore of Virginia with 2,672 persons attending. It is estimated that there are 4,500 growers in this territory. In spite of this good attendance the growers, as a body, evidently did not use the outlook material effectively in the planting of their 1930 potato acreage but responded to the prices received for potatoes the previous year. Eight similar meetings were held in Maryland with 625

people attending with results similar to those in Virginia. In North Carolina 8 meetings were held with 732 growers attending. There are approximately 1,700 commercial potato growers in North Carolina. In addition, 16 dealers' meetings were held having a total attendance of 370 persons; 3 meetings of fertilizer agencies with an attendance of 365 persons; 4 meetings with bankers with an attendance of 270 persons and 2 general meetings with an attendance of 850 persons. In addition, 8 bulletins were released from time to time containing current potato information and outlook material. Intentions to plant reports for early potatoes were released 4 months earlier than had been customary and the committee had hoped that through well directed publicity and through the public meetings the true situation would be kept before the industry with the hope of having the growers and dealers and supply merchants adjust their purchases of seed and fertilizer with the potato prospects outlined. The only 2 areas where acreage was effectively adjusted was (1) through a gentlemen's agreement between a few credit furnishing agencies in one territory to plant a certain number of acres of potatoes. It would not be advisable to mention this particular area but the close cooperation of the financing agencies enabled the acreage to be held at the point recommended. (2) In another area those furnishing production credits to growers assembled in a meeting candidly to discuss their problems and acreage intentions. When these were fully discussed each of the credit agencies signed its name to an agreement not to furnish credits in excess of the amount opposite its signature. This area was the only area in that particular state that did not increase its acreage in 1930 over that planted in 1929 whereas the acreage in that state was increased 25 per cent. These same areas are handling their 1931 credits in a similar way and it looks as though their acreage might be adjusted in accordance with economic facts.

We have a new area in North Carolina where two agencies furnish the production finances. These agencies are planning their 1931 production in accordance with the economic information furnished. In 1930 these agencies expanded their production advances to potato growers supplying the growers with three thousand 165-pound bags, one thousand eight hundred and fifty-five 150-pound bags, and three hundred and forty 100-pound bags of seed potatoes. This makes a total of approximately 51,116 pecks of seed potatoes supplied. In this area it takes about 50 pecks to plant one acre and a ton of fertilizer is also supplied for each acre of potatoes planted.

For 1931 these two agencies are supplying two thousand eight hundred and twenty 150-pound sacks of seed, or 28,200 pecks. On learning of this intended reduction in acreage a fertilizer company came into this territory supplying a cotton and tobacco grower, who was an in-and-outer as regards potatoes, with seven hundred and fifty 150-pound sacks or 7,500 pecks of seed potatoes making a total of 35,700 pecks planted in 1931 as compared with the 51,116 pecks planted in 1930. The one fertilizer company offset about one-third of the decrease in acreage.

The activities of the Substitute Crops and Enterprises Committee have progressed very slowly for the reason that it is indeed very difficult to recommend any substitute enterprise that may be profitable to the producers. A few very mild recommendations were made as to the planting of home gardens, the production of enough feed and forage crops for the work animals, the production of a supply of milk, butter, poultry, and eggs for home consumption. Many growers must first learn the fundamental principles of caring for and raising poultry and dairy cows. The planting of soil improvement crops was strongly recommended. In order to work out some definite recommendations and probably some definite crop rotations as substitute enterprises it was found advisable to make a very careful study and analysis of the business practices of the farmers in the territories involved. With the cooperation of the various extension services, agricultural experiment stations, agricultural colleges, and the Divisions of Farm Management and Agricultural Finance of the Bureau of Agricultural Economics a careful study is being made of the growers' problems and practices. Men have been assigned to consult certain growers several times during each year regarding their farm practices; these growers keeping a set of cost account books and cooperating with this study. When the study is complete some suggestions may be made from the results of these farm management studies.

Competition between marketing agencies furnishing credits to the producer is especially keen because the furnishing of such credits generally determines the agency through whom the grower will market his crop. When one starts to trace such credits one finds that the sources are generally so numerous in most areas that acreage is extremely hard to control except in those sections where credits are controlled by a few agencies. For example: Credit to plant about 4,000 acres was traced to connections in Seattle, Washington; other credits to plant a much larger acreage of potatoes along the Atlantic seaboard were traced to a

Los Angeles bank. Some agencies as a general rule will cooperate actively in an effort towards some credit limitations or at least in extending credit to those growers who have some form of equity. However, there are many agencies that will furnish production finances to growers having no equity and many of these agencies do not even protect themselves with a crop lien. In addition, there are several hundred fertilizer representatives working for various manufacturers. These local representatives extend credits and these small credit sources are difficult to influence. The more fertilizer sold the greater the commissions. So far these risks have been fairly good. In addition, credit is easily obtainable from many fertilizer manufacturers. Some agencies and some fertilizer companies advance a ton of fertilizer and in return obtain a stipulated number of barrels of potatoes at harvest time. Seed potatoes are often advanced similarly.

The committee believed that in order to establish an orderly marketing program for early potatoes it was necessary to obtain earlier and more accurate production data which when converted into the probable number of carloads for shipment from each producing section and placed in the hands of the marketing agencies, would permit those agencies to compute the daily or weekly shipments that it would be best to ship from their particular section. In a few localities this works out fairly well on a weekly basis but it did not work out very well on a daily basis. The Division of Crop and Livestock Estimates started some work on a special study of the effects of precipitation, cloudy days, temperatures and other weather factors on production in an endeavor to find out what particular application these factors have on the production of early potatoes in the various areas. The relationship between weather and production has been worked out with a reasonable degree of accuracy, well in advance of the heavy shipping season, for Florida and the eastern shore of Virginia and Maryland. In Florida such information saved some of the marketing agencies from carrying over a large surplus stock of barrels in 1930. By using this information they issued instructions to stop the making of barrels when these weather studies on April 1, 1930, indicated that the yields per acre would be exceptionally small for that year.

The various state marketing committees through exchange of intimate information regarding their own operations and intended operations were able to avoid undue overlapping between shipments from different regions.

The exchange of mutual confidences regarding sales of cars

rolling sold or unsold enabled the building up of confidence among the various distributors in the same region, between distributors in various regions and between distributors and buyers so that collective bargaining functioned without contracts, forfeitures, or agreement. In the past, price cutting wars have demoralized the confidence of the buyers so that they would hesitate to buy f.o.b. shipping point with any degree of confidence. It is extremely difficult to measure any value in dollars and cents resulting from market coordination activities. The fact, however, remains that these sub-committees desire that the marketing coordination activities be continued for they nearly all believe that it lends confidence in the industry. A temporary field office was established at the principal centers of production during the shipping season.

There is quoted an abstract from one of the letters received:

> For North Carolina, there are a good many deals that should be discussed and worked out before another season rolls around. We certainly feel that the Department's work in marketing this potato crop from Florida to Norfolk, was very effective this year and was the means of the farmers in North Carolina securing a million dollars or more for their crop of potatoes than they would have gotten working independently. We can readily see the great advantages of this movement when we compare the marketing of the North Carolina crop with the marketing of the Virginia crop that followed so closely.

There was issued bi-weekly an estimated carlot movement of potatoes a week in advance of the time of the movement. This being issued twice a week permits corrections to be made of previous forecasts.

It is hoped that this work will bring about closer cooperation between the growers, marketing agencies, fertilizer manufacturers and others interested in potatoes in order to stabilize the industry. The growers largely disregarded the Committee's advice in 1930 and followed the impulses that have impelled them to change their acreages in the past. This season the growers were given economic information outlining the cause for acreage changes, intended 1931 acreage for planting, crop prospects, prospective supply and demand and the probable average price they may receive for potatoes in 1931 for their region if producing conditions are normal. This information was presented to the growers in simple form so that they may understand it and apply it to their individual farm operations. No mention was made of acreage reduction or regulation. The economical production of quality potatoes was also stressed.

We do not believe that the results to be obtained on this season's operations on the whole will be any better than those ob-

tained last season for it will take some time to gain the confidence of the growers in the fact that there may be some value in the economic information presented to them by official agencies. However, one fact stands out and that is that each year an additional few bankers or dealers and growers are honestly convinced that there is something to the outlook information presented which has had a remarkable high percentage of accuracy so far. Progress, however, is slow, as it is difficult to change human nature and this in spite of the fact that there is more information with a good degree of reliability available on potatoes than there is on any other agricultural commodity. This is particularly true of the studies made by the Department of Agriculture in price analysis and influences governing price fluctuations. The cooperation of all of the official agencies, particularly in the field of research, have made available many facts and studies that have been most helpful to this work.

Since the establishment of the Inter-State Early Potato Committee, other producing regions have manifested some interest in a similar movement. Several meetings were held regarding the formation of a Potato Committee by interests in the Pacific Northwest group of states. The problems in this territory differ from those in the Southeast. Nevertheless, it was felt that better results could be accomplished in the Pacific Northwest if that entire territory would act as a regional group. After careful consideration the agricultural interests in Washington, Idaho, and Montana established a Pacific Northwest Potato Committee which began to function in September, 1930. Dean E. J. Iddings of the University of Idaho, is chairman of the Committee and Mr. Harry E. Drobish was selected as secretary. Cooperating in this enterprise are the Agricultural Extension Divisions of Idaho, Washington, and Montana, the office of Cooperative Extension Work and the Bureau of Agricultural Economics of the United States Department of Agriculture. Several state subcommittees have also been formed which will cope with the various problems encountered within the individual states.

It is hoped that the farmers of the Pacific Northwest will be aided in increasing their farming efficiency through the use of the economic information that will be passed on to them through the committee.

Some interest is also being shown in the southwestern group of states towards regional action to solve the many problems confronting the potato producers in that region.

THE LAW OF DIMINISHING FERTILITY OF THE SOIL, FROM THE POINT OF VIEW OF SOME OF THE RUSSIAN ECONOMISTS OF TODAY[1]

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My original intention was to limit this review article to a brief statement of the general position of Soviet economists on the question of diminishing fertility of the soil, accompanying it with a summary explanatory analysis. However, a careful examination of the aims of Gosplan (the State Planning of Production) and of the philosophy underlying the so-called "Five Years Plan," have convinced the writer of this article that a vital implication is hidden behind this approach to the concept of diminishing returns, and that the Soviet analysis of the law of diminishing fertility of the soil is but a link in a well planned departure from some of the fundamental notions generally held by economists the world over.

"The economics of military communism," says Preobrajensky,[2] "was the economics of state management of the military-consumption type, in which we were not accumulating, but were compelled to *spend* our resources in the most economical manner, when production itself was not *reproduction*, but a means of converting raw materials and basic capital into objects of consumption and defense." Preobrajensky points out that the present period is, on the other hand, that of "initial socialistic accumulation," which is based upon the ability of planned production to reproduce with a surplus the simultaneously consumed resources.[3] The "Five Years Plan" appears to be a natural and unavoidable outcome of this law of "initial socialistic accumulation," of the impulse to reproduce with a surplus, the emphasis being laid on total production as contrasted with total consumption. This notion in itself can hardly be considered new. "The world-wide demand for capital is everywhere recognized. The war was even more destructive of wealth than of life. The accumulation of capital depends, however, upon production in excess of consumption. That means that one of the most important problems before us today is the problem of thrift."[4] Ermansky

[1] "Fertility" is understood here as similarly to Marshall's usage. Principles, IV, iii, 3, pp. 160-161.
[2] Preobrajensky, E. The New Economics, Second edition, Moscow, 1926. Part 1, p. 39.
[3] See also, Bukharin's "The Economics of the Intermediate Period," Moscow, 1921.
[4] Society of Industrial Engineers, "Industrial Reconstruction Problems," March, 1919, N.Y.C., p. 20.

is very emphatic in pointing out "the urgent necessity of a rational organization of those scant resources which are now at our disposal."[5] And Sorokin is inclined to see a definite correlation between impoverishment and the expansion of governmental control.[6]

Thus in external analysis, one seems justified in saying that the so-called "Five Years Plan" now in operation in Russia is very much like, if not identical with, what Oliver Sheldon calls *rationalization,* that is, large scale (in this case nation-wide) application of the principles of scientific management.[7] The fact that this rationalization is effected through and under a strict governmental control (a usual feature of an extraordinary impoverishment and disorganization of economic life)[8] should not affect the external phase of the phenomenon. The "Five Years Plan" is but a means to an end, that end being "initial socialistic accumulation." It is after this end is achieved that a rational socialistic production is said to become possible, and it is at this point that a substantial departure is made by some of the leading Soviet economists from the generally accepted theory.

"By socialistic accumulation we mean," explains Preobrajensky,[9] "the addition to the functioning means of production of the surplus product which is being produced within a constituted socialistic economy and which does not enter into an additional distribution among the agents of socialistic production and the socialist state, but serves to widen the reproduction." In other words, Preobrajensky envisages a socialist state where the accumulation of capital, a constant widening of the reproductive scope, goes on without any specific return on capital. Once the "Five Years Plan" is put over, the "initial socialistic accumulation" attained, the rigid abstinence becomes no longer necessary and the Soviet economists see an almost automatic process of production with a permanently increasing surplus.

Taussig, on the other hand, has once remarked that "there is nothing automatic in the process, no certainty of replacement, no difference between the mode in which existing capital is replaced and that in which new capital comes into existence. . . . Capital would cease to be maintained with the complete dis-

[5] Ermansky, O. A. The Scientific Organization of Labor and the Taylor System, 3-d edition, Moscow, 1923, p. XV.
[6] Sorokin, P. A., "Impoverishment and the Expansion of Governmental Control," American J. Soc., Vol. 32, No. 2, pp. 206-216.
[7] Sheldon, O., quoted from The Taylor Society, "Scientific Management in American Industry," New York, 1929, p. 15.
[8] Sorokin, P.A., loc. cit., p. 213.
[9] Loc. cit., pp. 93-94.

appearance of return on it. This, of course, on the assumption that the régime of private property persists. I will not digress to the consideration of capital and its maintenance in a collectivist society.'"[10]

Carver, discussing the same topic, insists that "the productivity of capital is like that of land and labor, subject to the principle of marginal productivity, which is, as we have seen, a part of the general law of diminishing returns."[11]

"Russland ist ein ausgesprochener Agrarstaat und zahlreiche Merkmale Kennzeichen den Agrarcharacter seiner Wirtschaft,"[12] and it is to be expected, therefore, that any presentation of the peculiarly Russian economic doctrines would be largely in agricultural terms. The theoretical discussions of the law of diminishing returns are generally in such terms.

The Soviet doctrine of the socialistic accumulation assumes a total negation of the principle of diminishing returns, and Miroshkhin,[13] on whose paper a large part of this article is based, glancing over the contemporary opinion regarding the "so-called law of diminishing returns," dismisses J. B. Clark and the whole "Anglo-American School" with a few remarks to the effect that their's is a "social-political interpretation" designed to justify profits and the capitalistic order on the basis of the principle of diminishing productivity of successive units of input, which is evolved from the "so-called law of diminishing returns," and is nothing but an explanation of the existing distribution under capitalism, and that disproving the existence of this "law" would doom the capitalistic system to an inevitable collapse. It seems to the writer that an implication is here made to the effect that the so-called law of diminishing returns is merely an outcome of social maladjustments, easily avoidable under a socialistic system of planned production organization—an implication vital to the question: "Sein oder Nichtsein des Kapitalismus." At the same time, a complete overthrow of the law of diminishing returns seems essential for the justification of the communist economic order and policy—it is "a question of life and death for the whole system."[14] Miroshkhin[15] attempts to accomplish this through a detailed consideration of the case of diminishing fertility of the soil. *It is important to point out that he considers it as a secular phenomenon.*

[10] Taussig, F. W., Q. J. E., Vol. 22, No. 3, p. 343.
[11] Carver, T. N., "Distribution of Wealth," p. 220.
[12] Poletika, W. von, "Zeitschrift für Politik," IX, p. 1, Berlin.
[13] Miroshkhin, Y. A., "Concerning the 'Law' of Diminishing Fertility of the Soil," Puti Sel.-Khoz., Numbers 5 (11) and 6 (12), pp. 3-13, 3-15, Moscow, 1925.
[14] Preobrajensky, E., loc. cit., p. 65.
[15] Loc. cit.

While this article will be concerned primarily with presentation of the Soviet attitude toward the so-called law of diminishing returns, it seems necessary to preface this presentation with a brief summary of the stands taken by Marx, Engels, Rodbertus, and Esslen, since the Russians frequently and specifically refer to these writers. Marx may be said to have been fully aware of and to have appreciated Liebig's findings, yet he was interested chiefly in proving that the failure to restore soil fertility is due to the separation of man from the land due to the growth of cities; and he laid the whole difficulty at the door of the capitalistic system. Engels, as well as Marx, held that under socialism and later under communism Nature is made use of by man and in this sense conquered. "But one can control only what exists: to control steam power, to control cosmic action of the laws of Nature—this does not mean to destroy these laws."[16] Esslen[17] went further by maintaining that Nature does not restore fertility proportionally to the losses, and that there is a danger of a stage being reached where regardless of the magnitude of human effort Nature will absolutely refuse to replace the removed fertility. Rodbertus,[18] on the other hand, pointed out that heretofore the effort of man had largely been directed towards improving methods in the manufacturing industries and that agriculture had not as yet received any specific gains from the progress of chemistry or from the developments of mechanics. He expected that in the end the production of food will pass completely under the social regulation and become controllable.

At the plenum of the Council of the "State Scientific Research Institute of Agricultural Economics in Moscow," which took place during the months of January and February of 1928, something like a "round table conference" was conducted on the subject of the "law of diminishing fertility of the soil."[19] "In this dispute, the absolute proponents of the 'law of diminishing fertility,' were represented in the person of Professor N. N. Sukhanoff, as well as by the scientists who rejected its secular validity but accepted with qualifications some of its static elements, to wit, Professors P. P. Masloff, N. D. Kondratieff, A. V. Chayanoff, I. N. Jirkovich, N. P. Makaroff, and L. N. Litoshenko, and also the scientists categorically denying any evidence of the truth of this law, to wit, Professors N. I. Lyatschenko, G. S.

[16] Preobrajensky, E., loc. cit., pp. 58-59.
[17] Esslen, J., "Das Gesetz abnehmenden Bodenertrages seit Justus von Liebig," Muenchen, 1905.
[18] Rodbertus, K., "Briefe," Berlin, 1882.
[19] Russian economists appear to use the term "diminishing fertility" as an illustration of the general "law of diminishing returns"—it is helpful to keep this in mind.

Gordeeff, Y. A. Miroshkhin and A. N. Chelintzeff; and Messrs. S. G. Ujansky, A. F. Sivogrivoff, M. V. Sulkovsky, I. S. Kuvshinoff, V. V. Matiukhin and others.''[20] (By a curious coincidence, during the two years that followed Professor N. N. Sukhanoff was sentenced to a penal term of ten years for ''economic treason,'' and the majority of the scientists accepting the law of diminishing fertility with qualifications were removed from their scientific posts and placed under arrest—also under accusation of ''economic treason.'')

At the above-mentioned conference, Miroshkhin may be said to have been the outstanding exponent of the ''orthodox'' Soviet economic theory, representing the group of scientists flatly rejecting the ''so-called law of diminishing fertility of the soil.'' His discussion at this conference,[21] however, consisted largely of inferences from and elaboration of his previously expressed views on the subject, to the presentation of which, as they appeared in print in 1925,[22] this article largely confines itself for the sake of the clarity of exposition in the limits of a review article. Following is a brief summary of Miroshkhin's ideas:

The diminishing fertility of the soil, says Miroshkhin, may be analyzed from the standpoints of: natural, technical, or economic laws. He definitely limits his discussion to the ''natural law'' analysis. Miroshkhin assumes that the fundamental trait of the agricultural industry is the mass utilization of sun energy, not by mechanisms but by organisms, and, above all, by the chlorophyl-bearing plants; this necessitating knowledge of the fundamental factors of plant life and of the properties of environment as well as of the methods of harmonizing the two. The fundamental factors of plant life are: (1) the energic, light, and heat (which may act directly and indirectly, and are subject to experimental control only in greenhouses and pots), and (2) the material, water and nutritive elements, inevitably requiring some intermediate agent and entirely subject to experimental control.

Although these energic factors cannot be altered, they can be regulated within certain limits; for ''We may make adaptations to the longitude and meridian, to climatic elements and the magnitude of the cosmic source of supply.''[23] Miroshkhin believes that these energic factors are in some definite quantity correlated to the normal development of a plant, with a minimum essential for growth, and a maximum necessary for best results. This optimum, naturally, varies for each individual case; but whether it can be considered fixed or variable in time and in condition with the development and the rational conduct of agriculture (i.e., the progress of the agricultural industry) is a matter of experiment for each case. Estimates must be made, accordingly, of the mag-

[20] Bulletin of State Scientific Research Institute of Agricultural Economics in Moscow, No. 1-4, 1928, p. 75.

[21] "Once More Concerning the Law of Diminishing Returns," Bull. State Scient. Research Inst. of Ag. Econ. in Moscow, No. 1-4, 1928, pp. 15-39.

[22] Puti Sel.-Khoz., Numbers 5(11), 6(12), pp. 3-13, 3-15, Moscow, 1925.

[23] All paragraphs in the small type, except footnotes, are paraphrases of Miroshkhin's two articles in the Puti Sel.-Khoz., 5(11) and 6(12), 1925. All passages in quotation marks unless otherwise indicated, are almost literal translations from Miroshkhin's original Russian, and should be so considered. All the references to and quotations from other authors within the small-type paragraphs, are as given or as quoted by Miroshkhin.

nitude of the supply of those factors the natural combination of which gives the optimum growth conditions for a given plant. The limiting factors here appear to be the extent of ability of the plant world to undergo species variations and the extent of the inventive ability of man. Or, in other words, the reality of the law of diminishing fertility of the soil, not of the "economic form of its manifestation," depends upon: (1) whether the supply of natural factors is inexhaustible, and (2) whether man's creative power in economic activity is unlimited; and in the final analysis: "The question of the existence of the Law is reduced to a simple proof of the limitation of the quantity of sun energy falling upon a unit of the earth's surface" (Varga, "Essays on the Agrarian Question," as quoted by Miroshkhin). Miroshkhin stresses that he does not attempt as yet to offer the final solution, but he merely limits his discussion to indicating the first step in that direction.

Considering the so-called material factors, which are held subject to a certain regulation by man, Miroshkhin for convenience of analysis (not deviating too far from the actual situation) would say that the chief elements essential for plant development are: C, P, N, and K. Carbon comes from the air as CO_2 and is found in the soil moisture in the same form; it may be safely assumed to be inexhaustible as long as the organic world exists. The case of mineral combinations containing P, N, and K is, however, different. Here appears a possibility at least of depletion of supplies. But these supplies are very considerable, and besides, Nature comes along to meet the difficulty by reabsorption. The elements K and P are thus retained by the soil and only N can be easily washed out. Lime and sulphuric acid are also easily washed out, but their relative importance is not as great.

Miroshkhin cites the following figures from Arrhenius ("Chemistry in Modern Life") for the amounts of chemical elements extracted annually from the soil on a well cultivated plot. The unit is one hectare (about 2.5 acres) with climatic conditions the average for Sweden, the quantities being given in kilograms:

	N	P_2O_5	Lime	K
Wheat	70	30	15	58
Rye and barley	about the same as wheat			
Oats	58	25	25	90
Beets	160	60	110	220
Meadow hay	over 100	—	52	116

"Extracted from the soil," Miroshkhin quotes from Arrhenius, "these quantities of nutritive materials are approximately proportional to crop yields and vary with them from year to year and from location to location." He further concludes, on the basis of Arrhenius' data, that the grain-crop economies produce seemingly no depletion in K_2O, while the rhizocarpic and other potassium-consuming plants (tobacco, potatoes, beets, etc.) take out K_2O in significant amounts.

Parallel figures were obtained for Russia, and speaking of the phosphorus content of the average soil, Miroshkhin quotes Pryanishnikoff ("Studies in Fertilizers") to the effect that: If soil contains 0.1 per cent of P_2O_5, then 1 desyatin (2.7 acres) in an 8-inch layer, or 11,280,000 lbs. of soil, contains 11,280 lbs of P_2O_5. If a crop takes out 32 lbs. annually, then the supply of P_2O_5 would be exhausted (without outside additions) in 300-350 years.

Miroshkhin sums up his own attitude thus:

(1) "Mankind transfers nutrients of plants from the soil with every crop, and with the removal of the crop from the place of its harvesting to the place of consumption of the agricultural products."

(2) Some quantities of nutrient elements are washed out and carried in water to seas and oceans.

(3) Seemingly, there is a danger that sooner or later the exhausted soil will yield smaller crops.

(4) The above observations make evident a constant need of replacing all that is removed from the soil by plants. This need is one of the major concerns of the agricultural production.

(5) "However, fortunately, in the path of man on this track are enormous perspectives, and he will hardly meet here anything unsurmountable."

Miroshkhin presents a detailed analysis of the natural sources of supply of those elements which seem to be confronted with a possibility of future exhaustion, i.e., nitrogen, potassium, and phosphorus.

Considering nitrogen, Miroshkhin quotes the following table from G. Jones (Q.J.E., Vol. 34, No. 3, p. 417):

WORLD PRODUCTION OF NITROGEN IN 1913 IN TONS

From Chili nitrate	429,897
From ammonium sulphate	319,667
From calcium cyanamide	66,138
From other sources	25,353
Total	841,055

At the close of the last century, Miroshkhin recalls, the Chili supply was regarded sufficient for but another hundred years at the going rate of production, by 1903 the physical amount annually removed had increased 300 per cent and the supply was then estimated to last only 40 to 50 years. However, an official survey in 1913 found the actual remaining reserve to be at least sufficient to allow the present rate of extraction for another 200 years.

Hall ("Problems of Increasing the Agricultural Productivity," quoted by Miroshkhin) thought that the source of ammonium sulphate (coal) in disappearing "together with coal . . . while the exhaustion of Chili nitrate is a question of the near future." Here Miroshkhin reminds us that once it was thought that $(NH_4)_2SO_4$ would never be able to replace $NaNO_3$ as a source of nitrogen; however, in 1913 the annual amount of production of the former in terms of fixed nitrogen was equal to two-thirds of the Chili nitrate produced (the German production of ammonium sulphate making a significant increase of about three thousand per cent from 1913 to 1918).

Another important source of nitrogen, Miroshkhin continues, as everyone well knows, the air, is almost inexhaustible. Pryanishnikoff has shown that a column of air on one desyatin (2.7 acres) of surface area contains 160 million pounds of free nitrogen (equivalent to 960 million pounds of Chili nitrate); or that an area of about eight acres has a potential supply in its air columns equal to the total present annual consumption of the whole of Europe. A method for obtaining nitrogen from the air was discovered by Cavendish back in 1783, to be later adapted commercially. The Notoddene factory (Norway) is now able to produce nitrogen fertilizer at a cost of 72.3 krones (about $20.00 per ton), selling it in accordance with its N content of 13.2 per cent, the price being fixed on the basis of the market price of the N content of Chili nitrate. It is quite evident that this is a monopoly price and can therefore be greatly lowered by competition.

The annual world production of calcium cyanamide climbed to 284,640 tons of pure nitrogen in 1918. "Even if the sources of nitrogen as Chili nitrate and ammonium sulphate were at some future date exhausted," still, Miroshkhin concludes, we would

have waterpower giving us calcium nitrate and cyanamide, and the synthesis of ammonium, as the new sources of nitrogen. These new methods may be "successfully utilized only when demand will exceed supply . . . of ammonium, obtained now only as a by-product" (Q. J. E., Vol. 34, quoted by Miroshkhin); or, in other words, the question of development of these resources is again a price and not a technical consideration. Moreover, the fixation of N in the soil by certain leguminous plants is approximately equal to a full normal application of manure, 1½ tons to an acre. "Therefore the problem of supply of nitrogen is solved not only theoretically but also practically, and man will never have to worry on that score."

Passing over to the availability of P_2O_5 and of K_2O supplies, Miroshkhin considers first the former. Most of the mineral rocks the world over are known to contain apatite crystals—$CaFCa_4(PO_4)_3$—in amounts ranging from 0.1 to 1.00 per cent (Pryanishnikoff). City sewage can be also returned to the fields, as Liebig had suggested. The fossil phosphates (phosphorates, e.g., American slate, which is 60 to 80 per cent pure phosphate lime) are generously and widely distributed and are easily available. Slag from the steel and iron industry yields about 40 per cent of phosphate lime; and finally there are bones and several forms of guano as phosphorus pentoxide sources. The phosphate lime content of bones was estimated at 44 per cent by Arrhenius, while Pryanishnikoff's figures were 58 to 62 per cent of phosphate lime and 28 per cent of nitrogenous matter. Since comparatively little phosphoric acid is being washed out from the soil, there can be hardly any foundation, says Miroshkhin, for any apprehension of depletion of this element in the soil.

Still less alarm is to be raised over the K_2O supply, Miroshkhin believes, Pryanishnikoff has shown it to be widely distributed in nature, granites containing about 4 to 6 per cent and basalts 1 to 3 per cent. The total world annual consumption of potassium dioxide was estimated at 2,048 million pounds in 1914. The German ore fields alone contain about 750,000 times this amount, to say nothing of the Mediterranean Sea as a source of potash (approximated to be sufficient to meet the present demand for at least 900,000 years.) Water as a source of potash, it was pointed out by Arrhenius ("Chemistry in Modern Life," cited by Miroshkhin), is "practically unlimited."

Before reviewing the several experimental attempts to study the law of the diminishing fertility, Miroshkhin finds it expedient to go back to Liebig and look into his concept of the minimum. Even if the yield actually depends upon that nutritive element which is found in the least ratio to the plant's demand for nutritive matter, still, it seems obvious to Miroshkhin, this is not only a quantity function but also a function of the manner in which the factor is introduced (water, extra cultivation, etc.). This minimum Miroshkhin believes to be variable with changes in agricultural methods, including those due to selection and improvement in plants. Furthermore, he argues, it is quite apparent that fertilizer application may not only maintain the soil fertility but also gradually increase it. It is also true that introducing one factor and increasing its amount changes the relationship, the yield becoming a function of other minima. The above also holds for factors not under our direct control—heat and light—the optimum of which varies for each plant. But even here Miroshkhin sees potential extension of the zones of cultivation by reclamation and irrigation, and by acclimatization, selection, and development of plants.

Miroshkhin opens his discussion of the experimental approaches with these preliminary comments: (1) Such experiments are not numerous; (2) Their spheres of observation is very restricted, and (3) "Hardly anything can be proven by setting up artificially a simplified condition having very little in common with the multiplicity of complex phenomena in nature."

Speaking of Marshall's illustration of the law of diminishing returns (Marshall, A.—Principles, IV, Ch. iii, p. 155), Miroshkhin insists that since this example does not tell over what period the observations extended (one year or a number of years), whether the changes in the methods of cultivation were constant for each plot or were rotated, and whether the plots were identical in the qualitative relationships of the soil, it cannot be claimed to prove anything. Miroshkhin supports this argument by the findings of Skvortzoff, who has shown: (1) that wheat production is much cheaper in the economies where wheat follows beets or potatoes (intensive farming) and (2) that in the economies consisting of crops demanding higher labor capacity, the expenses absorb a smaller part of the gross income (such as production of wheat in the intensive regions of the U.S.R.R.). Manuiloff (cited by Miroshkhin), in his study of the labor days needed for production of wheat on a unit (2.7 acres) of land of the average fertility, obtained results the reverse of Marshall's. Thus while the crop yield per acre is decidedly higher for the U.S.A., its input in labor days is only 2.8 days per acre; the U.S.S.R. with lower yield shows an input of 7 days per acre.

Venn (Venn, J. A.—"Foundations of Agricultural Economics," 1923), who is, according to Miroshkhin, "undoubtedly better versed in the agricultural production than Marshall," supported the latter (i.e., Marshall). Venn's conclusions were based upon the experiments with wheat at Rothamsted Experimental Station taking the averages for 1852 to 1864. The technique of these experiments, however, Miroshkhin holds, showed shortcomings similar to those reported by Marshall.

Neisser (Archiv. f. Sozialwissenschaft, 1922, Vol. 49, No. 2) "acts in a more intelligent manner, using . . . experiments of Liebig, Wolff, and Wollny, and accompanying them by appropriate remarks." His conclusions Miroshkhin sums up thus:

(1) It is hard to say whether the living functions of a plant are proportional to the arbitrarily supplied conditions of growth.

(2) All the factors which intensify plant growth may not be affected simultaneously.

(3) It is fallacious to intensify one factor, holding the rest constant, and judge by these conditions the decrease in return.

(4) "Only when, on one hand, all the growth factors for a plant are intensified, and on the other hand, intensification of some one factor may, to a certain extent, substitute for the lack of others, may an increase in yield occur over a long time" (Neisser, loc. cit., quoted by Miroshkhin). This is in fact Liebig's law of the minimum.

(5) The sometimes observed decrease in the relative return from a certain plot of land is not to be blamed on a law of Nature, but rather appears to be a result of our limited knowledge of Nature, as well perhaps as of agricultural production, and the lack of interest in these; or due to purely economic relationships.

Miroshkhin inclines to accept Neisser's points 1, 2, and 5, and to regard points 3 and 4 as metaphysical as yet, but perhaps pointing the way for future analysis.

Hall (loc. cit.) is more in a position to base his assertions on factual data, and his emphasis upon bacterial activity in the soil, Miroshkhin hopes, may lead to some valuable additions to our knowledge of agricultural production. To Hall, according to Miroshkhin, the most vital problem lies in prevention of the unproductive expenditure of nitrogen, which is increasingly significant as the applications of N are increased. He (i.e., Hall) showed that the waste in manure application is higher than if mineral nitrates are applied, reaching as high as 75 per cent of the total. Nitrogen is lost through washing out, but *to a greater degree through the action of bacteria.* An illustration of this waste was observed (Hall, cited by Miroshkhin) in cultivation of plants under glass, the soil being mixed with manure, half and half. Such mixtures

comparatively soon became "sick"—infertile; however, heating made such mixtures fertile again, thus clearly showing that the cause here is not the washing out, but the internal microbic activity.

Hall, Miroshkhin tells us, expected much from selection of plants, emphasizing the feasibility of increasing leaf efficiency per a given quantity of sunlight and the production of grain of higher specific value. He considered the physical improvement of soil possible, now that engineering art is making the large-scale transportation of soil cheap and available. Miroshkhin regards Hall's conclusion as very significant: An antiseptic tillage of land *on a large scale*, similar to the purification of soil in pots, may seem but an unattainable dream; but probably primitive man would similarly conceive it as impossible to prepare a field of wheat free of weeds and yielding crops equal to ours.

What conclusions can be drawn from the above discussion, queries Miroshkhin? As originally formulated by Turgot ("Observations sur le mèmoire de M. de S. Peravy en faveur de l'impôt-indirect," Oeuvres de Turgot, ed. M. Eugène Daire, Paris, 1841, cited by Miroshkhin), the law of diminishing returns reads something like this: Under a given set of conditions, a further application of labor and other means of production to the soil, after a certain point will yield a diminishing additional increment. From Turgot down to the present time, this law has been either accepted as an axiom or qualified by more and more conditioning and restricting restatements. With Marshall and his followers it became a tendency, the implication being made that some interfering phenomena may occur along its path. Miroshkhin maintains that the factors underlying this "tendency" were never carefully analyzed, and that the advocates of this notion "hide themselves behind the observations made when there was not only no scientifically conducted agriculture, but even the rest of the sciences, in a broad sense, were in their infancy."

The restricted meaning of the law of diminishing returns, i.e., "its particular application to agricultural production," Miroshkhin holds to be hardly justifiable and cites Schumpeter ("Das Rentenprinzip in der Verteilungslehre") to the effect that this concept may as well be applied to all and any means of production and carried to infinity. Varga (loc. cit.), on the other hand, as Miroshkhin points out, believed that as long as agriculture consists in transforming of the inorganic substances found in the soil into organic matter, with the aid of sun, air and atmospheric precipitations, the technique of agriculture will fail to nullify the effect of diminishing fertility of the soil; as this transforming is a function of sunlight, it is therefore possible only on the horizontally located areas; furthermore, since atmospheric heat is also absolutely needed, it is impossible to lengthen the productive period in agriculture. Generally, we have to be satisfied with one annual crop, the artificial heating of the soil being out of the question due to excessive cost. Varga assumed, therefore, explains Miroshkhin, that the law of diminishing fertility of the soil is a fact, and can be overcome only in the case when transforming of inorganic substances into organic will be carried in a purely chemical way, without assistance of sun, air and water.

Miroshkhin adheres closely to the optimistic positions of Rodbertus and Hall (as they are interpreted by him). He points out that the area limitation holds for any industry employing factories and machinery as much as for agriculture. That selection of plants is of great importance, Miroshkhin thinks, can hardly be disputed, and as to "whether more sunlight can be thrown on the same area, future developments in the technical knowledge will determine." The possibility of collecting and then directing the accumulated sun energy to various spots is already being investigated. And finally, Miroshkhin indicates that there is still another possibility, the

direct synthesis of organic matter. Using ultra-violet rays (Hg lamp), Arrhenius obtained from a mixture of carbonic acid (H_2CO_3) and aqueous vapour the fundamental reactions of chlorophyl assimilation, in the absence of chlorophyl and under the ordinary temperature conditions. Although, owing to economic considerations, Miroshkhin explains, Arrhenius did not attach any great significance to this process, he did not deny its possible importance in the future.

"We are not prophets and cannot predict whether . . . mankind of the future will be able to deflect from itself the heavy yoke of the law of diminishing fertility of the soil or turn to a regulation of increase in population as the only way out"; thus Miroshkhin qualifies his stand. He even goes further: recalling to us Ulvich's definition of a scientific law as a statistical truth (*Beseda*, No. 6, 1925), and the fact that agricultural production over a large part of the world is still in a very primitive condition, he is ready to admit that under such conditions it appears that the agricultural production may obey some particular laws or law—namely, the law of diminishing returns. However, whether agriculture is subject to a special law of development differing from the laws governing other fields of production can be shown only through experiments. At present there are no foundations for such a claim. Assuming that man is not helpless, Miroshkhin concludes his discussion with this statement: "Mankind will probably never reach that stage where his labor will become unproductive, i.e., where the expenses, in the form of past labor or the means of production, or in the form of present labor (direct), will cease to be compensated for in product."

The foregoing states briefly the general position taken by the Soviet economists (assuming Miroshkhin's attitude to be representative) on the question of the law of diminishing fertility of the soil. There can be very little doubt that "l'origine de la théorie naturaliste de rendements décroissants dois être recherchée dans les conceptions sur la nutrition des plantes."[24] However, it is one thing to study the problem of diminishing returns with the help of natural sciences—e.g., as diminishing fertility of the soil—and to argue on the basis of the results obtained; and quite a different thing to consider the law of diminishing fertility of the soil as a natural law "paying no attention as to the way in which . . . nutritive matter got into the soil: whether it is there naturally, or was put there with the help of man as fertilizers," as it is done by Esslen;[25] or to regard "the expenses involved in cultivation of the soil and harvesting of the crop and the return from these expenses . . . as magnitudes depending exclusively upon Nature."[26] Any generalizations on the basis of the conclusions arrived at in this latter manner can hardly be considered to bear on the validity of the law of diminishing returns; they remind one of the other extreme method previously

[24] Byé, M., "Le lois des rendements non proportionnels, leur evolution et leur formes modernes," 1928, p. 17.

Lang (Spillman and Lang)—"The Law of Diminishing Returns" also believed that the basis of the law of diminishing returns is to be obtained only by means of the natural sciences.

[25] Cited by Miroshkhin, Y. A., Bull. State Scient. Research Inst. Ag. Econ. in Moscow, No. 1-4, 1928, p. 29.

[26] Miroshkhin, Y. A., Puti Sel. Khoz., No. 5 (11), 1925, p. 5.

employed, the shortcomings of which were aptly pointed out by Clapham[27] and by Taussig.[28] The law of permanence of matter is well known and the Principle of Large Numbers (the law of averages) may be effectively employed to reduce almost any natural phenomenon to a convenient homogeneity. It should be quite obvious that to argue for the existence of such natural law of diminishing fertility of the soil is perfectly absurd, and to argue against its existence would have been a waste of time had there not been numerous attempts to uphold this "natural law."

It seems to me that Miroshkhin is not always consistent in his treatment of the subject. Having once explicitly stated that he is concerned with the "natural" aspect of the law of diminishing fertility of the soil, he supports his attack of Marshall by the cost studies of Skvortzoff and of Manuiloff. The failure of some writers in the field to differentiate between quantity and value was long ago pointed out by Taussig.[29] Miroshkhin appears to be guilty of this old offence. Moreover, his conclusion is strictly in terms of labor cost and it can be hardly thought of as "depending exclusively upon Nature."

At this point, Black may be quoted to the effect that: "although it is inaccurate to say that the land supply considered in the productivity sense is fixed, nevertheless it must be conceded that it can be increased only within limits and with increasing difficulty at each step."[30] While possible agricultural expansion and further utilization of resources now idle are of tremendous future significance, one must not lose sight of the costs involved. Miroshkhin, as well as the majority of Soviet economists, in trying to frame his approach in a purely "natural" form, seems to overlook entirely the enormous labor cost involved, or perhaps even thinks of it as a free good (he also pays no regard to the area limitation of land supply).

Taussig has once remarked that "what is contained in the bowels of the earth must always be more or less uncertain . . . mankind may look forward, for long ages to come, to an increase rather than to a diminution of its available mineral resources."[31] Such and similar incomplete statements concerning the supply of land in terms of its fertility, especially since the process of nitrogen fixation was greatly improved[32] and vast strides in soil

[27] Clapham, J. H., "Of Empty Economic Boxes," Econ. Jour., Vol. 32, 1922, p. 314.
[28] Taussig, F. W., Q. J. E., Vol. 22, No. 3, p. 349.
[29] Ibid., Principles, Vol. II, ch. 42, No. 3, p. 69.
[30] Black, J. D., Production Economics, 1925.
[31] Taussig, F. W., "Principles," Vol. II, ch. 44, No. 2, p. 101 and p. 102.
[32] Berry, A. J., "The Atmosphere," Cambridge (England), 1913, pp. 1-142.
Maxted, E. B., "Ammonia and the Nitrides," London, 1921, pp. 1-112.
Knox, J., "The Fixation of Atmospheric Nitrogen," London, 1921, pp. 1-124.

chemistry and plant nutrition were made, stand directly in need of thorough restatement, and the "laws" based upon them demand subsequent re-analysis.

"Maimon affirme que la théorie de la connaissance doit précéder la logique formelle si celle-ci doit avoir une réelle signification."[33] An analogous precaution should be followed in discussing the law of diminishing fertility of the soil. "In diesem Sinn ist der bekannte Ausspruch Marshalls zu verstehen, dass 'qualitative analysis has done the greater part of its work' und dass 'higher and more difficult task of quantitative analysis must rest upon the slow growth of thorough realistic statistics'."[34] The contribution of Miroshkhin is a step in this direction.

A few explanatory remarks may be not amiss concerning the factual side of Miroshkhin's presentation. Halligan has pointed out that "it has been ascertained that only three and sometimes four elements are required to be furnished the plant for its complete development, as the other elements are fortunately present in sufficient quantities in the air and the soil so that we need not consider them. Nitrogen (N), phosphorus (phosphoric acid P_2O_5) and potassium (potash K_2O) are the elements usually exhausted most readily from the soil, and occasionally calcium (lime, CaO)."[35] A similar position was taken by Hall[36] and a number of other prominent soil chemists; and since Miroshkhin inclines to treat the "law of the minimum"[37] as still a metaphysical principle, he can hardly be reproached for being inconsistent in restricting his analysis to C, N, P, and K. His inclusion of C, however may be thought confusing—if C is included, why not also H and O?

It is also to be regretted that Miroshkhin has completely failed to pay due attention to:

(1) Mechanical factors in the soil fertility (texture, pore space, soil density and capacity for water, surface tension and capillarity, percolation and drainage, hygroscopic moisture, etc.).

(2) Colloids.

(3) Acidity and alkalinity of the soil.

(4) Toxic and parasitic factors.

(5) Effects of natural forces (erosions, etc.).

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[33] Hoeffding, H., "La relativité philosophique," (traduit du danois par J. de Coussange) Paris, 1924, p. 19.

[34] Schams, E., "Konstantz und Variabilitaet oekonomischer Groessenbeziehungen," Weltwirtschaftliches Archiv, 31 band, 1930 I, Jena, p. 419.

[35] Halligan, J. E., "Soil Fertility and Fertilizers," Easton, Pa., 1912, p. 21.

[36] Hall, A. D., "The Soil," N.Y., 1912, p. 140.

[37] I find myself at variance with Miroshkhin on this point. It seems to me that the principle of the minimum has at least sufficient substantiation to be seriously considered. Spillman and Lang ("The Law of Diminishing Returns") present a comprehensive critical review of the evidence (Lang, unfortunately, has confused the principle of the minimum with the law of diminishing returns).

(6) Improvements in the manufacture of fertilizers.

The physics of soils is perhaps almost as important as the soil chemistry in the phenomena of the soil fertility, and no chemical analysis of the soil is complete without some specific reference to colloids. Miroshkhin admits of the importance of the microbic phenomena, but forgets that "since organisms are merely special instances of colloid systems, there can exist no biological problems in which colloid chemistry must not play some part . . . the ferments are known for the most part only in colloid form. Living matter seems to be a meeting ground for absorption of effects and colloid catalyses."[38] Miroshkhin's neglect of the soil acidity and alkalinity as a factor in the soil fertility is partly justifiable. The relation of soil acidity to plant growth is still obscure to many workers in the field.[39] "Soil acidity has been confused by the titrometric procedures, has been neglected, or has been considered to be an unreality by one or another school." That toxic effects tend to increase and parasites present a more difficult problem as the cultivation becomes more "intensive" is generally admitted; on the other hand, improvements in the manufactured fertilizers, particularly, such as increase their solubility,[40] tend to offset the "diminishing fertility."

Some confusion may result from Miroshkhin's statement that the grain crops remove little or no potash from the soil. It has been pointed out by Page that "potash manures have been shown to be particularly effective in aiding the production of carbohydrates in plants, so that they were peculiarly beneficial to such crops as potatoes and mangolds, which contain a high proportion of starch or sugar."[41] This and, perhaps, the fact that grain itself does not remove much potash[42]—straw does, but it is often returned to the soil—may account for Miroshkhin's seemingly careless statement.

It is well to recall here Hall's definition of fertility: "Fertility proper is by no means wholly a chemical question, dependent upon the amount of plant food the soil contains; in many cases the physical conditions which regulate the supply of air and water to the plant, and as a corollary, the bacterial life, are far more potent in producing a fertile soil than the mere amount of

[38] Ostwald, W., "Introduction to Theoretical and Applied Colloid Chemistry," N.Y., 1917, pp. 156 and 162.
Also see: Waksman, S. A. and Davison, W. C., "Enzymes," Baltimore, 1926, pp. 31-61, 95-121, 125-137.
Findlay, A., "Chemistry in the Service of Man," London, 1916, p. 202.
[39] Page, H. J., in "Chemistry in 20th Century" (ed. by Armstrong), London, 1925, pp. 231-232.
[40] Collins, S., "Chemical Fertilizers and Parasiticides," N.Y., 1920, pp. 229-238.
[41] Loc. cit., p. 225.
[42] Halligan, J. S., loc. cit., p. 19.

nutrient material it contains. Especially is this the case in an old settled country like England, where manure is cheap and abundant; here a fertile soil is often one which is not rich in itself, but one that is responsive to, and makes the most of, the manure applied."[43] This definition comes very close to Marshall's and to the usage of the Soviet economists, the latter often employing "productivity" and "fertility" interchangedly. The important difference, however, lies in the fact that while Miroshkhin has in mind a dynamic fertility, i.e., any fertility at any time and any place, Marshall definitely gives it a static connotation by saying that "the term fertility has no meaning except with reference to the special circumstances of a particular time and place."[43a]

I think it is also important to point out that Marshall and his followers are more commonly thinking of the static statement of the law of diminishing fertility of the soil, while Miroshkhin is primarily interested in the secular or dynamic aspect. Yet Marshall also considers the secular aspect of it at times, as in the following prognosis: "Whatever may be the future developments of the arts of agriculture, a continued increase in the application of capital and labor to land must ultimately result in a diminution of the extra produce which can be obtained by a given extra amount of capital and labor."[44] While Miroshkhin's generalizations from the "natural" dynamic law of diminishing fertility of the soil to the static physical law of diminishing returns may be said to be premature, it is quite obvious that Marshall's conclusion as to the ultimate, unescapable setting in of the diminishing returns is likewise logically inadmissible.[45] In the judgment of the writer Miroshkhin's approach, in spite of its many shortcomings and insufficiencies, is to be hailed as a step in the right direction.

In the introductory paragraph of this article, reference was made to the philosophy underlying the so-called "Five Years Plan." It was pointed out that it denotes an abnormally speeded production accompanied by an abnormally curtailed consumption, conducted on a nation-wide scale under an almost "air-tight" governmental control, which presupposes the execution of a carefully worked-out plan. The cardinal assumption of the Soviet

[43] Hall, A. D., The Soil, p. 234.

[43a] Marshall, A., "Principles," IV, iii, 3, p. 161.
The definitions of "static" and "dynamic" are taken from Chuproff, A. A., "Essays in Theory of Statistics," St. Peterburg, 1909, p. 33.

[44] Marshall, A., loc. cit., IV, iii, 2, p. 153.

[45] Chuproff in his brilliant analysis of the interrelation of the static and dynamic sciences has conclusively proven that neither the pure static nor the pure dynamic laws are of much practical value if studied independently. It is only through coordination of the dynamic principles to the static that we can try to explain and understand the existing phenomena. See Chuproff, A.A., Essays in Theory of Statistics. St. Peterburg, 1909, pp. 1-94.

economists is that, since the law of diminishing returns is non-existent, once the "initial socialistic accumulation" is attained, rigid abstinence becomes no longer necessary, and the socialistic millenium begins. The narrow limits of this review article permit only a few summary statements on this point. It seems to the writer that the leaders of Soviet production could be well reminded of these words of Frederick Taylor, the reputed father of the American scientific management: "I wish to repeat and emphasize that nine-tenths of the trouble comes from those on the management side. . . . Do not expect to get through with it for five years, because you will not."[46] The Soviet theory of socialistic accumulation also appears to resemble greatly Böhm-Bawerk's round-about-production, the main difference being that the former is not willing to admit that technical improvements produce only temporary effect.[47] The "initial socialistic accumulation" in this light is nothing but what is generally referred to as "capital goods"—the admission that this initial accumulation is needed is in itself an admission of grave material impoverishment. Whether it is only temporary, or in other words a sacrifice of present consumption for much greater future benefits, need not be stated.

Without necessarily agreeing with Cassel that "progress consists in raising the productivity of human labor as well as in multiplying the labor,"[48] one may cite the commonly accepted belief that the nations of the future should increasingly strive to set up the per capita well-being of their people as their objective. J. B. Clark might have been in error in trying to justify the existing capitalistic distribution on the basis of production, but the Soviet justification of their philosophy of production on the basis of theoretical distribution is surely no more sound. The answer must lie between these two extremes. It is difficult to see how production of capital can be anything but capitalistic. The following statement of Muhs is highly suggestive: "Als dann kann gesagt werden, dass sich die dialektische Tendenz der historischen Bewegung in *einer weitreichenden Umbildung des individualistischen Konkurrenz Kapitalismus* des neunzehnten Jahrhunderts *zu einem sozial gerichteten Kollektivkapitalismus aeussert;* jener verkoerpert die *erste,* dieser die *zweite Epoche* des Kapitalismus."[49]

[46] Quoted from: The Taylor Society, "Scientific Management in American Industry," N.Y., 1929, p. 32.

[47] Compare in: Böhm-Bawerk, E., "Positive Theory of Capital," N.Y., Reprint 1923, p. 113 (footnote).

[48] Cassel, G., "Theory of Social Economy," London, 1923, Vol. II, p. 484.

[49] Muhs, K., "Die Chance des Kapitalismus," Weltwirtschaftliches Archiv, 31 band, 1930 I, Jena, p. 34.

NOTES

EFFECT OF CENTRALIZED HOLDINGS ON PRICES

The program of the Federal Farm Board, involving as it does so large an emphasis on the centralized control of large quantities of farm products in the hands of "national" cooperative marketing associations, makes desirable much more discussion of the pricing policies of these organizations than they have yet received. It is very easily possible for such a concentration of product to result in bargaining losses rather than bargaining gains unless sales are very wisely handled. Probably the best discussion available on price policies for cooperative associations is that in pages 39 to 74 of Minnesota Bulletin 211, "Cooperative Central Marketing Organization" by J. D. Black and H. B. Price. Its implications might well be studied both by cooperative association leaders and by members of the Federal Farm Board. Nevertheless, some phases of the argument there presented seem to need modification and further study.

The general trend of the analysis leads to the conclusion that selling will probably be more wisely and efficiently handled by a number of regional associations than by a single large selling agency. This view is well presented and almost certainly reflects accurately the main aspects of the matter. Careful study of the operations in wheat, cotton, and especially of those in dairy products and wool during the past year is likely to substantiate that view. We have, however, far too little knowledge of the possibilities and limitations of bargaining in market price determination. On page 60 of Bulletin 211, the following statement appears under the general heading "controling time of movement to market":

"Need the district or state organizations be combined in order to secure concerted action? There seem to be no valid arguments for it. It is true that their forecasts of necessary price might not all agree (the assumption is made that each of several organizations computes a price at which the quantity produced will move, and sells as this price is reached); and that one might be willing to sell at, say, 10 cents less per bushel than some others. But all that the other organizations would need to do would be to hold off and let the one close out its stock. Their market would be all the better subsequently. The chances are that the combined judgments of all the different organizations as to necessary price would be a better forecast than that of any one. The effect of having several organizations acting independently would therefore be a better ordered flow to market than if all acted in concert. This statement refers, of course, only to the time of flow to market—it does not refer to distribution to different markets.

"How large a proportion of the crop needs, therefore, to be under one control? So far as controlling the time of movement to market is concerned, the only essential thing is to have as much of the crop as possible under some intelligent control—there is no purpose whatever in having it under one control. In fact, the task is made more difficult if the whole crop is under one control. . . ."

This view assumes that there is a definite position of the demand schedule for a given crop during a given year, and that its position is not changed by the way the supplies offered are handled. Merchants and manufacturers have for many years used the expression "spoiling the market" for any action which involved price cutting or throwing quantities of goods on the market indiscriminately, recognizing that such action might alter the position of the demand schedule. Black and Price recognize one aspect of this problem when they say on page 62 that "the foregoing conclusion is predicated on the assumption that the combination of buyers does

not have power to maintain the price to the producers at a lower level than warranted throughout the whole season, or from season to season.''

But is a combination of buyers necessary to the establishment of a level of prices distinctly lower than that which might otherwise have been established? In the retail market, a small break in prices may lead to a sharp contraction in buying, not through combination, but merely as a matter of group psychology (this, of course, may have many of the aspects of combination). There is much to indicate that similar conditions exist in some at least of the wholesale markets. In the case of cotton and wool, mills buy rather freely if they are convinced that the market has become stabilized. They have a greater interest in the stability of the market than in any moderate difference in the price itself, since market stability has much to do with the confidence they manifest in dealing with their customers. Minor changes in the price of wheat are not reflected in the price of bread, nor are moderate changes in the price of wool reflected in the price of suits. Is there not, then, considerable reason to suspect that within moderate ranges, the demand schedule in the wholesale market shows given slopes above and below a given level of prices, which level may be changed by the psychology induced by the opening period in the marketing of the product? Note, for example, the strenuous efforts of the auctioneer to start a sale off at a relatively high level of prices.

The view suggested is a variation of that discussed by Professor F. W. Taussig in his article ''Is Market Price Determinate?''[1] It points to the fact that we have much too little definite knowledge of the variations which prices may show with given quantities offered. No doubt many of the demand schedules are in effect vertical for an appreciable distance above or below the price at which equilibrium was reached.

This should not be taken as a defense of the concentration of holdings in single organizations. There is no little indication that this latter policy may materially weaken the bargaining position of the organization unless a very skillful selling policy is followed, especially if there is no definite price making machinery outside the organization.

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MAINE BLUEBERRIES AS A SPECIALTY CROP

Research in agricultural economics is concerning itself more and more at present with the problems of numerous specialty crops. These in many cases prove to be of more interest than those of staple crops. An example of this is the blueberry industry which has developed in Maine. The author first studied this farm enterprise in 1922, on the basis of a questionnaire that was returned by two hundred growers representing 32,213 acres of blueberry land. Later Mr. D. W. Reed made a survey of the industry in Washington County, and finally Dr. C. H. Merchant made an analysis of blueberry production on 239 farms in Washington and Hancock Counties. Cooperating growers have also kept financial accounts.

Blueberry growing as a commercial enterprise is restricted to an area along the Atlantic coastal plain extending from the Kennebec River to Quoddy Bay, and inland some ten to twenty miles. The topography is level to rolling and in places broken by streams and swamps. This land was originally wooded, but in the early history of the state was broken up into relatively small farms, and a considerable

[1] Taussig, F. W. "Is Market Price Determinate?" Quarterly Journal of Economics, May, 1921, pp. 394-411.

portion of the woodland was cleared. The soils are principally light sandy to gravelly loams, and the annual precipitation is from 38 to 45 inches, well distributed throughout the year. The growing season is from 120 to 150 days in length, with the last killing frost in the spring around May 11 to 18 and the first killing frost in the fall around September 20 to October 17. The area seems to be restricted in the north by competition with general crop production; and in the area to the west dairying and truck crops have the advantage of being nearer to markets than the blueberry area is. In its own territory, blueberries have in considerable part taken the place of other crops. The rest of the blueberry crop, and by far the smaller part of it, is grown either on newly cleared woodland, or on what is known as the barrens —land that was cleared some years ago, but that has never been broken up into farms. It has been burned over rather regularly every few years since the lumber was cut from it, and the organic matter has become badly depleted. This section is level to rolling and is located at considerable distance from transportation.

One of the interesting phases of blueberry production is the method of establishing a field. If the soil is of the right sort, the blueberry plant will establish itself naturally whenever the land is burned over. During the first few years the stand of bushes may not be entirely satisfactory, but with proper handling, good stands are eventually secured. The principal concern is the destruction of weeds and other kinds of bushes in the spots where blueberry bushes are too thin for a satisfactory stand. A blueberry plantation needs to be burned over about every third year, as a method of pruning the blueberry plants and destroying weeds and other undesirable growth. Apparently after about two seasons, the blueberry bushes become so much branched and so thick that the crop is materially reduced thereby. The burning is done in the early spring. As the season advances the bushes send up single shoots and develop fruit buds. The next year these shoots bear heavily. They then branch and produce a similar heavy crop the second year. Branching continues the third year, but the crop in most instances shows a very sharp decrease in yield, and succeeding crops are unsatisfactory. But practice in the matter of burning is by no means standardized. Table 1 summarizes the results of the study of burning practice made in 1922. It will be seen from these data that yields are nearly 100 per cent greater on farms where a system of burning is practiced than where such is not the case, and that yields secured on the barrens are low in comparison with those on other types of land.

The studies made indicate that the better growers burn approximately one-third

TABLE 1.—COMPARISONS OF BLUEBERRY YIELDS ON DIFFERENT TYPES OF LAND UNDER DIFFERENT SYSTEMS OF BURNING

Type of Land	Number of Operators	Total Acres Operated	Yield per Acre		
			1921 Bu.	1922 Bu.	Ave. Bu.
Old fields and pastures					
Regular yearly burn[1]	31	698	8.3	12.2	10.2
Entire acreage burned every three years	30	288	4.2	11.2	7.7
Without regular yearly burn	52	924	4.6	6.8	5.7
Newly cleared woodland					
Regular yearly burn[1]	5	112	6.2	11.8	9.0
Without regular yearly burn	17	159	2.3	6.7	4.5
Combination of newly cleared woodland and old fields and pastures					
Regular yearly burn[1]	14	561	6.3	12.8	9.6
Without regular yearly burn	31	735	2.2	6.3	4.2
Barrens					
Regular yearly burn[1]	13	26939	.2	.8	.5
Without regular yearly burn	7	1797	.07	.50	.28

[1] Burn a part each year—usually one third.

spring burn, one-third producing a first year's crop, and the remaining third producing a second season's crop. This practice gives a fairly even distribution of labor, provides better utilization of materials used in making the burn, and insures a more uniform income from blueberries. Where this plan is followed, the weeds and bushes are cut in the late summer and fall after the second year's crop is harvested. In order to secure an even burn and develop a satisfactory fruiting stand over the entire area, it is frequently necessary to use some material which will assist in making the burn complete. The cheap hay and straw commonly used for this purpose is spread at the of the plantation each year, thus having one-third of the field recovering from the rate of from 1,000 to 1,500 pounds per acre. Poor stands are frequent where not enough such material is used or where the burn is made under unfavorable spring conditions. The hay is applied in the fall, but the burning is done in the spring as soon as the top layer of material is sufficiently dry for a fire to spread rapidly over the land, but before the soil becomes so dry that burning would injure the organic matter in the soil.

The data collected indicate that the yield of berries varies with the age of the bushes, the percentage of a perfect stand, the frequency with which the plantation is burned and the thoroughness of the burn. Blueberry plants appear to reach the height of their productive capacity at between 20 and 30 years of age. Productive capacity declines but slowly following this period. Where satisfactory burns have been made, the first year per-acre yield of berries will average around 30 bushels as against less than one-half of this amount where the burns have been unsatisfactory. Under average conditions, the per-acre yield is about 20 bushels for the first crop after burning, and about 12 bushels for the second crop. The third and succeeding crops will average but little over one bushel per acre.

The crop is harvested in August and September. Up to this time the farmer and his family are usually able to handle all of the work. Additional labor is necessary for the harvesting of the crop. This labor is secured largely from local sources. Entire families camp out on the plantation for employment during harvest period. Harvesting labor is paid on the piece basis. The rate varies from 75c to $1.25 per bushel, depending upon the size of the yield and other conditions incident to harvest. The crop is harvested by means of a specially constructed scoop-like arrangement fitted with flexible teeth which rake the berries from the vines allowing them to roll into the scoop.

The organization of blueberry farms is passing through a stage of transition. The management has changed from somewhat accidental and haphazard arrangements to rather definite systems. Crop receipts on blueberry farms constitute about 45 per cent of total receipts, wood and lumber represents around 33 per cent, and the remainder is from livestock and other sources. Blueberries constitute about 84 per cent of the crop receipts. Investment per farm is relatively small, averaging slightly under $5,000. The land referred to as "barrens" is held in large areas and is controlled in the main by men who operate canning factories. This type of land is not increasing in area. Of the other type of land, however, a larger acreage is being put into blueberries each year.

Annual production in the state is about 160,000 bushels, with a farm value of slightly over $500,000. The canning factories which handle the crop are in part operated by private companies and in part by grower-owned cooperatives. Much of the crop is packed in Number 10 cans and sold to the bakery trade for use in pies. An increasing amount in recent years has been going into Number 2 cans for the family trade. The product is marketed throughout the country, but more especially in the east and west central states.

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APPRAISAL OF DAIRY COWS

Let us suppose that a farmer contemplates purchasing dairy cows and is considering a two-year-old heifer and a six-year-old cow. Before he makes up his mind as to how much he can afford to pay, he will by some process or other determine to his partial satisfaction the probable returns to be realized. He may discover that the young heifer, if she is a high producer, will yield butter-fat at an annual rate of 428 pounds and that the six-year-old produces 672 pounds. He will realize that if she lives to become six years old the young heifer is likely to produce at the same rate as the other, but he knows that many things may happen during a period of four years and is led to appraise her at a lower value than the one already at this high stage of production.

A dairy expert was asked to appraise these hypothetical animals and his estimate was $200 for the heifer and $400 for the six-year-old. He had in mind market prices and it is probable that he was not far away from the truth.

If, however, the farmer keeps cows for the purpose of producing milk or butter-fat he is more concerned with their future production than with their price, and there may be a very considerable discrepancy between prices and such future production in the dairy industry. This the writer has been undertaking to demonstrate.

The income from a dairy cow may be conveniently classified into three kinds, butter-fat, calves, and supplemental products, and the estimation of these various income rates is primarily a matter of probabilities.

It is obvious that the value of an individual cow may be regarded as being the present worth of the future incomes from these three sources. Professor Gowen of the Maine Agricultural Experiment Station provides a formula for determining the probable income from butter-fat from a cow that lives; but inasmuch as she may die or become otherwise incapacitated, the mortality hazard must be considered, and this reduces the expected income and therefore its present value. The writer has developed a formula for the expectation of life and productivity, from which the following mortality table has been computed:[1]

TABLE 1.—ILLUSTRATING MORTALITY EQUATION

No. of individuals-E	Age-t (years)
1,000	2
850	4
706	6
578	8
462	10

Gowen's equation, together with the expectation of life equation, furnishes a basis for computing the income from the butter-fat.

In computing the income to be derived from the second source—the calves, it was found that no credit could be allowed the original cow for the apparent full value of all the heifers that a cow would normally produce. For example (figures approximate), a dam such as assumed has a value of $1,200 as a producer of butter-fat. If she should produce even two calves of equal value, as butter-fat producers, the dam's value at this point would be computed to be her butter-fat producing value, plus the butter-fat producing value of the two calves; or a total value of $3,200 (allowing $200 for the cost of raising the calves). But now, to the value of the calves must be

[1] This formula is published in an article by the writer in the Proceedings of the Utah Academy of Science, of which this note is a résumé.

added their calf producing value. This in turn would increase the value of the dam and again the value of the calves and so on to infinity.

As a first approximation, it was assumed that the number of dairy cows should remain constant and each cow was credited with a single heifer calf of equivalent value to the dam, and this credit made at the time of the dam's retirement from the herd. This is admittedly somewhat over-conservative, as there is no obvious reason why there should not be a permanent increase at least in proportion to the increase of the human population. But it is found to be in harmony with the fundamental law of balance which regulates the production, not only in the dairy industry, but in agriculture in general. Furthermore, inasmuch as this analysis has for its purpose the illustration of a fundamental method of procedure rather than a fundamental set of values, no account need be taken of such other sources of income as may be included in the third class.

The values obtained on this conservative basis for the high-producing type mentioned at the beginning are very high as compared with market prices, and, furthermore, the maximum value is reached at the beginning of productive age, contrary to popular opinion. That is, the young heifer has a greater number of income years to be capitalized, and a lower insurance cost. But the algebraic development seems straightforward and conclusive. The basic equation[2] shows the relation between the value, the rate of change of value, and the rate of income, and furnishes a convenient check of market prices.

George Gardner

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COURSES IN AGRICULTURAL PRICES

According to available catalogue announcements, about a dozen state agricultural colleges offer courses in agricultural prices. The teaching of this subject has developed so recently that methods are anything but standardized. Course descriptions indicate four general methods of handling the subject: (1) an elaboration of the principles of value and price, with particular reference to farm products and agricultural problems such as proposed farm relief measures; (2) a study of the factors affecting and the movement of prices of specific commodities; (3) the application of statistical method in the analysis of commodity prices; (4) a combination of any of the above.

It would seem very undesirable to omit altogether the study of specific commodity prices. Hence, it appears that there are really two principal decisions to make: first, on the desirability of including an adequate review of the general principles of value and price as applied to farm products; and second, on the emphasis to be given methods of statistical analysis of prices, as opposed to the study of the results of such analysis, or price movements and their causes.

With respect to the first of these questions, experience in teaching both elementary economics and agricultural prices (and in grading the examination papers of other teachers!) has thoroughly convinced the writer that the beginning course in economics can be expected to do little more than familiarize the student with some of the terminology of price theory, and to give him a very hazy conception of the relation between utility, value, price, and cost. This confused picture loses whatever degree of clarity it originally may have had, as the square of the number of days after the

[2] $R = iv - I$ where R = annual rate of increase of value
v = actual value
i = interest rate
I = net income rate

final examination! Courses in agricultural prices which do not include, first, a thorough review of price theory, are essentially weak in that the student only partly understands the significance of the analyses of commodity prices which may be made. *The important thing is to get the student in the habit of analyzing any given price situation in terms of the fundamental principles involved.* Only in this way will he be prepared to meet the practical price problems which confront him in later life.

With respect to the second problem, namely, the amount of emphasis which should be placed on statistical methods of price analysis, it is unfortunately true that the procedure followed generally has been influenced most by the type of training and personal likes and dislikes of the instructor, *rather than the needs of the student.* If the instructor's early training happened not to have emphasized statistics, the class sometimes has been forced to pass hurriedly over, or omit altogether, important contributions to the field of agricultural prices. If statistical experimentation carried the greatest professorial appeal, the class of embryo county agents and what not has been forced to follow along paths frequently suited only to the few specializing in agricultural economics. Thus, the so-called course in agricultural prices may be largely a course in price analysis, essentially an advanced course in statistical method as applied to price data.

This condition of affairs no doubt has arisen partly from the fact that in the past little or no distinction has been made between the study of prices and price analysis. As a matter of fact, there is a very important difference between the two, very similar to that between inorganic chemistry and quantitative analysis.

With this in mind, the writer is of the opinion that the study of agricultural prices as such should precede a course in the methodology of price analysis. It would seem just as essential for a student of price analysis to be familiar with the factors affecting commodity prices as with statistical method. Yet a student of prices needs to know very little about methodology in order to obtain a useful grasp of the subject, as evidenced by the success of outlook work among farmers. Simple exercises on the making of supply-price curves, calculation of trend lines, and the like may be given as laboratory work in the course in prices. Many students not specializing in agricultural economics will be able to benefit from such a course, whereas if it were more technical, or entailed statistical prerequisites, they could not afford the necessary time. The limited number of elective hours already prevents many students specializing in other subjects, such as vocational agriculture, from obtaining some much needed work in economics. If these students are not to be further discouraged from taking courses like agricultural prices the latter must be arranged with regard to the requirements and limitations of those not specializing in this field.

F. L. Thomsen

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Columbia

ASSESSMENTS OF REAL PROPERTY IN MISSOURI

Eternal vigilance is apparently the price of maintaining even a poor position in the scramble to avoid paying an undue share of the mounting burden of taxes. The Missouri farmer and his proponents have been caught asleep at the switch, and doubtless Missouri is not unique in this respect. The graph below is almost self-explanatory and represents a condition that, developing in 1920, went unchallenged by Missouri farmers till 1931.

In 1919, Missouri's tax commission sponsored a move to have assessments on all property increased to 100 per cent of true value. By common consent, the assess-

ing had been done theretofore, particularly in rural areas, at a rate nominally one-half of true value. Actually assessments were at about 25 per cent of sales values. The response to the movement is indicated in Figure 1. All unplatted lands are included in the upper curve; hence owners of mines and other rural landed property have supposedly suffered along with the farmers. Note that the step-up of assessed valuations occurred chiefly on unplatted lands. These were raised from $733,711,593

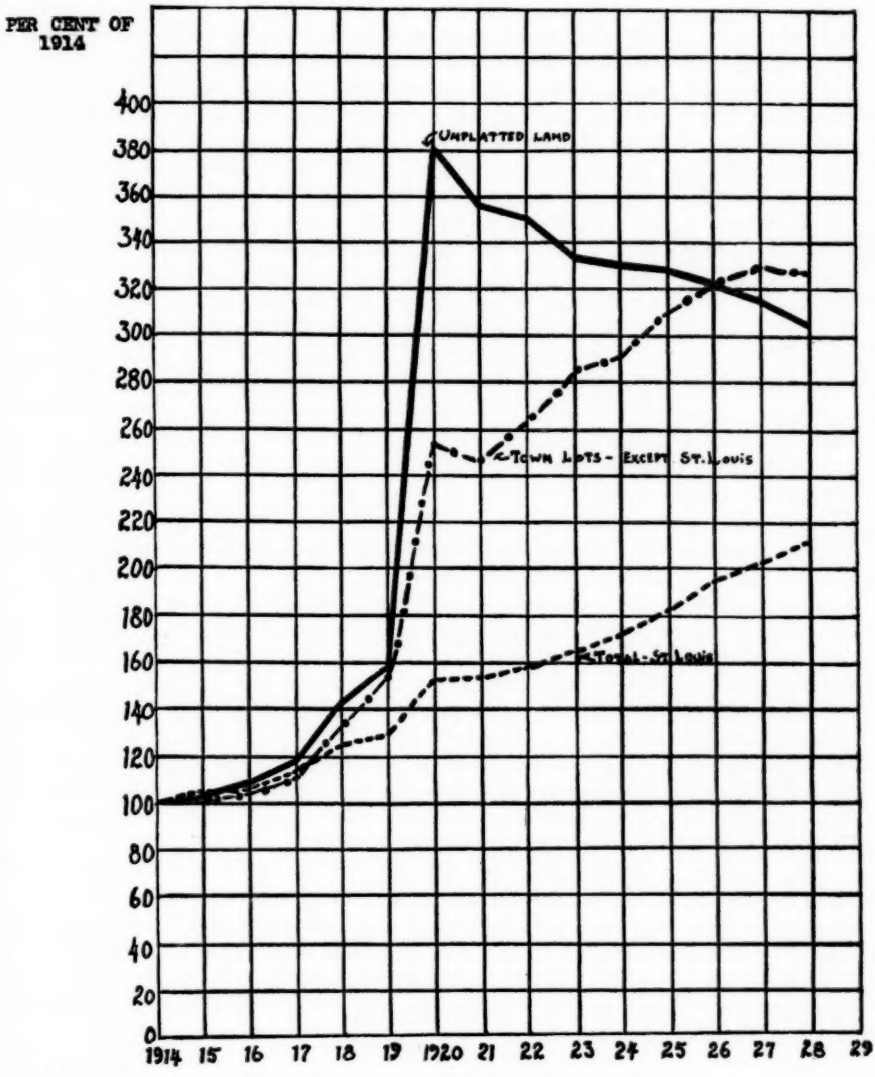

FIGURE 1.—ASSESSED VALUATIONS OF REAL ESTATE IN MISSOURI, 1914 to 1928[1]

[1] Sources, 1914 to 1917—Reports of the State Auditor, 1918 to 1928—Reports of the State Board of Equalization.

in 1919 to $1,767,568,718, in 1920, an increase to 241 per cent of the 1919 figure. In St. Louis the increase was scarcely larger than had been occurring in preceding years, and the valuations for 1920 were only 119 per cent of those of 1919. For platted property in cities and villages other than St. Louis, the increase was intermediate.

A preliminary attempt to discover whether or not the ratio of assessed valuations to sales prices in St. Louis prior to 1920 had been higher than elsewhere within the state, as had been averred, brought forth meager results. The only type of property in St. Louis for which sales values could be secured were the residential. Principals to transactions in real estate are not required to state the consideration in the deed. Only occasionally does a statement of the consideration creep in, and then, save for exceptional instances, only on residential property. Such transactions involve, on an average, about $10,000. Properties of this type are notoriously over-assessed in relation to business and commercial property, and it is impossible to draw definite conclusions from a sample of sales of this kind only.

According to the data obtained, ratios of assessed to sales values on these properties averaged higher than was common on the general run of unplatted lands. But a comparison based on mere averages is not valid. Rather the contrast must be between the ratios of assessed to sales values of these small residential properties of St. Louis with the lower valued farm properties. In Missouri as elsewhere, the ratios of assessed to sales values for the lower-value classes of farm property is much higher than for the average of all classes.[2] In other words, to be significant the contrasts must be between comparable classes in a frequency distribution. What such comparisons will reveal has not yet been discovered. It is quite possible that prior to 1920 there was little discrepancy in ratios in St. Louis and on farms when comparisons are more accurately made.

A further question of importance still unsettled is the relative over-valuation of farm as contrasted to city properties on the basis of present earnings. Prior to 1920 net rents of Missouri farm lands were capitalized at about 4 per cent, and in many of the northwestern counties at a much smaller figure. The capitalization rate obtaining in the cities has not been determined, but was hardly less than, and may have been as much as twice the figure for farm lands. Research in the field of relative capitalization rates is badly needed.

Since 1920 assessed valuations of unplatted lands have fallen but have lagged behind the declining values of farm real estate. Thus, by 1928 the assessed valuations had fallen by a bare 20 per cent but land values had declined more than 40 per cent. As a consequence the ratios of assessed to sales values on farm, and presumably other unplatted property, have risen. Evidently taxes too have risen in relation to real values since this year (1920) despite slowly falling assessments.

No compilation of the values of city property in St. Louis have been made. But while land in farms and the number of farms and farmers in Missouri had declined since 1920 the population of St. Louis has definitely increased. Its growth in population cannot be judged by the figures for St. Louis alone, which indicate a gain of not far from 100,000 between 1920 and 1930, since the larger part of the increase has taken place outside the limits of the city itself in places that are nevertheless economically part of the city.

Real estate values in St. Louis have probably increased somewhat less rapidly than in Chicago front foot values of which (based on 1914) are given along with

[2] See G. B. Clarke, The Assessment System in Minnesota in Its Relation to Equality of Taxation, Journal of Farm Economics, October, 1930.

TABLE 1.—ASSESSED VALUATIONS OF REAL PROPERTY IN ST. LOUIS AND FRONT FOOT VALUES IN CHICAGO, 1914-1929[9]
1914 = 100

Year	Assessed Valuations of St. Louis Real Estate	Front Foot Values In Chicago
1914	100	100
1915	105	106
1916	106	109
1917	114	111
1918	125	112
1919	128	115
1920	153	117
1921	155	120
1922	158	153
1923	165	187
1924	172	231
1925	183	273
1926	195	328
1927	202	379
1928	211	404
1929		407

assessed valuations of real estate in St. Louis in the table above. Even allowing for a considerable margin of difference between the two cities, however, it is evident that property values in St. Louis have gone up more rapidly than assessments. Hence the city tax payer finds that his taxes are being levied upon a smaller base in relation to returns and real values in 1930 than in 1920. The status of the city payer of state taxes hence improves steadily while that of his country cousin grows steadily worse.

Conrad H. Hammar

University of Missouri

[9] Assessed valuations of real property in St. Louis were taken from the same source as in the Figure above. Front foot values in Chicago were arranged from a chart appearing in an article by Herbert D. Simpson "The Influence of Public Improvements on Land Values" published in the Annals of the American Academy of Political and Social Science, March, 1930.

BOOKS RECEIVED

Hamlin, Scoville, Editor. *The Menace of Overproduction.* New York: John Wiley & Sons. 1930. 202 pp. $2.75.

Hanna, John. *The Law of Cooperative Marketing Associations.* New York: Roland Press Company. 1931. 509 pp. $7.00 (Reviewed in this issue.)

Macauley, Frederick R. *The Smoothing of Time Series:* New York: J. J. Little and Ives. National Bureau of Economic Research. 1931. 172 pp. $2.00.

Murray, K. A. H. *Factors Affecting the Prices of Livestock in Great Britain.* Oxford: Clarendon Press. 1931. 180 pp. $2.75.

Taylor, Henry C. *Outlines of Agricultural Economics.* New York: Macmillan Company. 1931. 614 pp. $3.25.

Wallace, Benjamin B., and Edminster, Lynn R. *International Control of Raw Materials.* Washington, D.C.: Brookings Institute. 1930. 479 pp. $3.50.

Whittlesey, Charles R. *Governmental Control of Crude Rubber—The Stevenson Plan.* Princeton: Princeton University Press. 1931. 235 pp. $2.50. (Reviewed in this issue.)

BOOK REVIEWS

Governmental Control of Crude Rubber—The Stevenson Plan, by Charles R. Whittlesey. Princeton: Princeton University Press, 1931. 235 pp. $2.50.

For several years the Stevenson Plan of rubber production control has been of common interest to those concerned with plans for disposing of production surpluses. The subject of governmental control of raw materials has, however, been so controversial as to obscure the nature, merits and difficulties of the plan. This book is, therefore, a very welcome addition to the literature of farm relief. It is a careful scientific scrutiny of "an ideal case for testing the policy of the governmental control of raw materials."

The book is divided into ten chapters which cover the development and administration of the Stevenson Plan, its effect on producing, consuming, and investing countries, and other theoretical considerations. While readers will probably be most interested in conclusions, to the reviewer the descriptive and analytical sections seem of paramount importance. In fact, the conclusions write themselves as one proceeds to study the plan as worked out in an evolutionary manner by the author.

While the author's conclusions are not particularly dogmatic, there are often indications which show his disapproval of anti-*laissez faire* schemes. The difficulty in drawing up charges against the scheme as a whole is shown by the following guarded summary statement:

"It is probable, therefore, that on balance the Stevenson Act was disadvantageous to society as a whole. It is further possible that, despite the high profits realized by the growers during much of the period of restriction, in time the restrictive measures will prove to have been disadvantageous to the plantation industry itself."

Since this book was undertaken to appraise this scheme of production control, agricultural economists will wish to know whether the difficulties were inherent in the scheme itself or in its administration. The conclusions of the author suggest that the plan failed because it was not sufficiently flexible and because an adequate and continuous control of the supply could not be secured. The difficulties of administration are indicated by the author's statement that "experience in the enforcement of the Stevenson Act in the middle east showed remarkable similarity to experience in the enforcement of the Volstead Act in the United States."

Nevertheless the author's conclusions do not seem to preclude further experiments of the Stevenson sort. "Experience with the Stevenson Act has demonstrated clearly the difficulty of administering such a scheme equitably and effectively. It has indicated, furthermore, that unless *restriction can be extended to planting while output is being restricted* or unless the *control can be made effective over the entire field,* the high prices which result may stimulate potential overproduction and so make the situation worse instead of better." (My italics.)

In a footnote the author goes even further: "Experience with the Stevenson Plan, as unsatisfactory as it has been, has not demonstrated that control of raw materials must fail. It is still possible that a sufficiently enlightened and unhampered group of men might regulate the supply of a raw material more economically than it will be regulated by the forces of free competition. There is, however, a strong case against control by any organization that would, in practice, be established."

This attitude is far different from the point of view expressed by those who point derisively at the "failure" of the Stevenson Plan, particularly as an argument by analogy that the Farm Board may as well discontinue its stabilization program.

The author has performed a very important service in describing the difficulties involved in production control, whether in rubber, wheat, cotton or other crops. It might even be said that the author has helped to clear the way for further attempts at production control by showing how further controls must not be operated. Such questions as: What was the Stevenson Plan? What was its plan of operation? Why was it stopped? are fully answered in this book.

Joseph G. Knapp

North Carolina State College of Agriculture

The Law of Cooperative Marketing Associations, by John Hanna. New York: Roland Press Company, 1931. 509 pp. $7.00.

The Law of Cooperative Marketing Associations is the latest book on this timely subject to come from the press. It discusses the development of the cooperative statutes and shows how they came to be in their present form. The unstandardized status of the standard cooperative marketing act is made apparent by an exhaustive comparison and analysis of those acts. Reasons for statutory differences in the various cooperative marketing acts are given. Those interested in ascertaining what state has a cooperative marketing act that is suited to their particular needs should find the book of much value. Scores of cases involving cooperative associations that have been passed upon by the courts are discussed and cited.

The relation existing between an association and its members is treated. The fact that membership in an association is normally separate and apart from the marketing contracts of the association is brought out. The author takes the position, with which the writer of this review agrees, that the products received by an association under the ordinary purchase and sale type of marketing agreement are subject to seizure by creditors of the association to satisfy judgments obtained against it.

The legal responsibility of an association and of its officers, directors and members is considered, with appropriate citations. A number of forms of articles of incorporation, by-laws and marketing agreements may be found in the Appendix. The manner of and means for financing associations is discussed. In connection with commodity financing the warehouse laws of the various states are succinctly discussed and the Federal Warehouse Act is quite fully treated. The powers, functions, and methods of operation of the Federal Intermediate Credit Banks and of the Federal Farm Board are briefly and clearly covered. The legal status of trust receipts in connection with commodity financing is rather elaborately treated. This is a comparatively new subject and those interested should find the discussion thereof in the book under review of decided value. The writer reluctantly disagrees with the position taken by the author that a cooperative marketing association may be declared an involuntary bankrupt.

The book is written in a clear and readable form. Several hundred cases involving cooperative associations, or bearing upon questions that may arise in connection with the organization and operation of associations, are appropriately cited. The book is one that will be of particular value to attorneys for cooperative marketing associations and to banks that loan to such associations. The cooperative executive and the student of cooperation also will find in it material and suggestions of high value.

L. S. Hulbert

Chief Attorney, Federal Farm Board

NEWS ITEMS

Two years ago the Advisory Committee on Social and Economic Research in Agriculture of the Social Science Research Council appointed a subcommittee to consider the subject of graduate training for agricultural economists and rural sociologists. The report which this subcommittee rendered recommended, among other things, that funds be secured to provide graduate training of outstanding scope and quality in Washington for persons preparing themselves for research in agricultural economics and rural sociology. The object of this proposal was to make the rich resources of data and the large and specialized personnel to be found in various governmental and private agencies located in Washington more accessible to graduate students. Such funds were secured and the work begun in a modest way in the second semester of the academic year 1930-31. A larger offering of courses will be made for 1931-32, namely, six semester courses and a seminar running throughout the year. This list of special courses in agricultural economics and rural sociology is as follows:

Rural Social Problems. Two periods a week. Second Semester—C. J. Galpin, Head, Division of Farm Population and Rural Life, Bureau of Agricultural Economics.

Taxation in Relation to Agriculture. Two periods a week. First semester—Eric Englund, Assistant Chief, Bureau of Agricultural Economics.

National Land Problems and Policies. Two periods a week. Second Semester—Lewis C. Gray, Head, Division of Land Economics, Bureau of Agricultural Economics.

Farm Mortgage Finance. Two periods a week. First semester—Russell C. Engberg, Head, Statistical Division, Federal Farm Loan Bureau. David L. Wickens, Agricultural Economist, Division of Agricultural Finance, Bureau of Agricultural Economics.

Marketing Agricultural Products. Two periods a week. First Semester—W. H. S. Stevens, Assistant Chief Economist, Federal Trade Commission.

Principles and Practice of Co-operation. Two periods a week. Second Semester—E. G. Nourse, Director, Institute of Economics and A. W. McKay, Head, Division of Co-operative Marketing, Federal Farm Board.

Seminar in Agricultural Economics. One period a week. First semester—Drs. Nourse, Enberg, and Stevens, Messrs. Englund and Wickens. Second Semester—Drs. Nourse, Gray and Galpin and Mr. McKay.

Supervision of the work in agricultural economics and rural sociology has been entrusted to a subcommittee appointed by the Social Science Research Council. The membership is as follows:

E. G. Nourse, Chairman, Director of the Institute of Economics.

John D. Black, Professor of Agricultural Economics, Harvard University.

H. C. M. Case, Head, Department of Farm Organization and Management University of Illinois.

Lewis C. Gray, Head, Division of Land Economics, Bureau of Agricultural Economics.

Nils A. Olsen, Chief, Bureau of Agricultural Economics.

The work is strictly graduate in character, and is administered as a part of the Graduate School of American University.

At the invitation of J. S. Davis, Chief Economist of the Federal Farm Board, a group of economists, chiefly agricultural economists, gathered in Washington on

May 18 and 19 to participate in a conference on agricultural policy with the Farm Board and members of its staff. Attending the conference in addition to the members of the staff were twenty-nine economists who are not in the federal service and fifteen economists from the Federal Department of Agriculture. The conference gave attention to the Board's cooperative marketing policy, to its stabilization policies, to the problem of acreage reduction and agricultural readjustment, and to the relationship of the activities of the Board to the work of the United States Department of Agriculture and the state colleges of agriculture.

The annual meeting of the Western Farm Economic Association was in session at Pullman, Washington, and Moscow, Idaho, as this issue of the Journal went to press. The principal lines of discussion dealt with marketing and farm management research, with the relation between research and extension in these two fields, with the coordination of farm management and outlook work, and with the possibilities of cooperation between groups of states and the U. S. Bureau of Agricultural Economics on regional problems of the West. The officers for the ensuing year are: President H. R. Tolley, University of California; Vice-President, M. L. Wilson, University of Montana; Secretary-Treasurer, Paul A. Eke, University of Idaho.

Thirteen North Carolina farms were surveyed and mapped in detail by the Bureau of Public Roads U. S. Department of Agriculture, in 1930 in cooperation with the Department of Agricultural Economics, North Carolina State College of Agriculture, as a part of a farm management study of field layout and the use of equipment. These maps and a farm business record present a detailed picture of how each farm was operated in 1930. A revised farm layout has been prepared that includes larger fields, a systematic crop rotation, and other suggestions for improving the organization and operation of the farm. The project will be continued for several years in order to determine the changes which should be made and the results that may be expected from work of this type.

"Agricultural Economics Extension" is the name of a new mimeographed periodical for the information of extension workers, the first issue of which appeared on June 8. The paper is prepared by the Division of Extension in Agricultural Economics, Office of Cooperative Extension Work, in cooperation with the Bureau of Agricultural Economics, United States Department of Agriculture.

The Oberly Memorial Prize this year has been awarded to Everett E. Edwards of the Bureau of Agricultural Economics, U. S. Department of Agriculture, for his publication entitled "A Bibliography of the History of Agriculture in the United States." This prize is awarded biennially in honor of Eunice Rockwood Oberly, a librarian of the Bureau of Plant Industry, U. S. Department of Agriculture, widely known in scientific circles for her preparation of bibliographies of scientific literature, who died in 1921. As winner of first prize, Mr. Edwards will receive the interest for two years on the Eunice Rockwood Oberly Memorial Fund, amounting to $1,050. Honorable mention in the contest this year went to Miss Louise O. Bercaw, also of the Bureau of Agricultural Economics for a selected bibliography on "Rural Standards of Living." Six other bibliographies were entered. Bibliographies to be entered in the current biennium must be received by the Chairman of the Committee, Miss Claribel R. Barnett, Librarian, U. S. Department of Agriculture, on or before January 1, 1933.

Dates for regional outlook conferences this fall have been set as follows: At Salt Lake City, Utah, July 27-30; at Urbana, Ill., September 16-18; at State College,

Pa., October 27-29; and at Memphis, Tenn., November 10-14. The New England conference will be held in Washington, D.C., at the close of the general conference on the agricultural outlook.

The Committee on Fellowships in Agricultural Economics and Rural Sociology of the Social Science Research Council announces the following list of appointees and alternates for the academic year 1931-32.

Appointee	*Field*	*Present Connection*	*University to be Attended*
Ackerman, Joseph	Ag. Ec.	University of Illinois	Harvard University
Bentley, Ronald C.	Ag. Ec.	Iowa State College	Harvard University
Braun, Elmer W.	Ag. Ec.	University of California	Columbia University
Cole, Ralph H.	Ag. Ec.	University of Nebraska	Harvard University
Crickman, C. W.	Ag. Ec.	U. S. Department of Agriculture	Harvard University
Dorn, Harold F.	Rur. Soc.	University of Wisconsin	University of Wisconsin
Gilman, Virgil D.	Ag. Ec.	Montana State College	University of Minnesota and Harvard University
Hale, Roger F.	Ag. Ec.	U. S. Department of Agriculture	Columbia University
Hedges, Harold	Ag. Ec.	University of Nebraska	University of Minnesota
Hitchcock, John A.	Ag. Ec.	Cornell University	Cornell University
Hudelson, Robert R.	Ag. Ec.	University of Illinois	Harvard University
Hurd, Edgar B.	Ag. Ec.	U. S. Department of Agriculture	Harvard University
Loomis, Charles P.	Rur. Soc.	North Carolina State University	Harvard University
Lucas, Broder F.	Ag. Ec.	University of California	University of California and Harvard University
McBride, John W.	Ag. Ec.	Princeton University	Cornell University and Ohio State University
Mighell, Ronald L.	Ag. Ec.	Massachusetts State College	Harvard University
Moore, Henry R.	Ag. Ec.	Ohio State University	Northwestern University
Oyler, Merton D.	Rur. Soc.	Kentucky Agricultural Experiment Station	University of Chicago
Rowe, William H.	Ag. Ec.	U. S. Department of Agriculture	Harvard University
Wells, Oris V.	Ag. Ec.	U. S. Department of Agriculture	Harvard University
Alternates			
Maxton, Jacob L.	Ag. Ec.	Virginia Agricultural Experiment Station	Cornell University
Mortenson, W. P.	Ag. Ec.	University of Wisconsin	Harvard University
Boyer, Philips B.	Rur. Soc.	University of Tennessee	University of Chicago

The Agricultural Economics Branch, Department of Agriculture, Ottawa, is cooperating with the Pioneer Belts Committee and the Universities of Manitoba,

Saskatchewan, and Alberta, in making a farm organization study in the three Praire Province. Field work began early in June.

The Vermont Commission on Country Life, H. C. Taylor, Director, organized in the spring of 1928 as a three-year project, held a three-day conference on June 16, 17 and 18 at which time reports were presented by the chairmen of eighteen committees under whose direction the various phases of Vermont rural life have been studied with a view to making recommendations for the future development of the State. The reports of these committees have been published in a volume of approximately 300 pages which may be secured by addressing Professor H. F. Perkins, Burlington, Vermont.

The Southwestern Political and Social Science Association held it Twelfth Annual Meeting at the Skirvin Hotel in Oklahoma City on April 3-4, 1931. The general theme of the papers read in the Agricultural Economics Section was the development of a research program to be related to the problem of farm relief. Papers were presented by O. J. Hall, B. M. Gile, and C. O. Brannen of the University of Arkansas; O. D. Duncan and L. S. Ellis of the Oklahoma Agricultural and Mechanical College; Elmer Johnson, University of Texas; and V. P. Lee and J. L. Watson, Texas Agricultural and Mechanical College. B. M. Gile was made chairman of the section for the year 1931-32. At the general business session the name "Southwestern Social Science Association," was adopted to supersede the former name of the Association, and the official organ hereafter will be called the "Southwestern Social Science Quarterly."

Cost of production studies are being initiated in Oklahoma this year for the first time by other than the survey method. The new project is a joint undertaking of the Bureau of Agricultural Economics and Department of Agricultural Economics at the college. Dr. P. H. Stephens and Mr. B. H. Thibodeaux are in immediate charge of the project. Seventy-five farmers in each of two types of farming areas are keeping farm account books. In addition detailed cost of production data are being collected currently by the route method.

Seven hundred and eighty Indiana farm records for the year 1930 are being closed and summarized by the Department of Farm Management and Rural Economics at Purdue University.

The Tennessee Agricultural Experiment Station is cooperating with the Federal Bureau of Agricultural Economics and other agencies in a study of economic and social conditions in the mountain area of the State. Active work on the project began on July 1, 1931.

The Institute of Social and Religious Research of New York is making a careful study of social and religious conditions in four rural counties of Tennessee. Active field work began in May, 1931, in Overton County, and work in the other three counties is to follow immediately.

Bolton High School in Shelby County, Tennessee, has a farm of about 1,200 acres which the Tennessee Agricultural Experiment Station has been requested to use for research and demonstration purposes. The School has also requested the Department of Agricultural Economics of the Station to make an economic and social survey of the community and to plan demonstrations to be carried out through the high school faculty and student body.

A conference of agricultural economists and rural sociologists of the southeastern states and the Federal Bureau of Agricultural Economics was held in Knoxville, Tennessee, during March, 1931, for the purpose of considering plans for a joint study of the Southern Appalachian region.

The Fourth International Biennial Universal Cotton Standards Conference assembled in Washington, D.C., May 9, to approve copies of the Universal Cotton Standards. There were 21 foreign delegates and 47 American cotton representatives.

Mr. R. A. Ballinger, Assistant Agricultural Economist, Virginia Polytechnic Institute, spent part of the spring quarter at the University of Minnesota, completing work for the Ph.D. degree.

Professor John D. Black of Harvard University attended the Assembly of the International Union for the Scientific Investigation of Population Problems which was held in London on June 15-19 as Chairman of Commission I on Population and Food Supply.

Mr. Max Bovarnick, graduate assistant in agricultural economics at Massachusetts State College received the master's degree in June, 1931.

Dr. George B. Clarke, who received the appointment of Assistant Economist as a member of the Experiment Station and Extension Service staffs of Connecticut Agricultural College in October, 1930, is developing a plan of research and extension work in the field of fruit and vegetable marketing.

Mr. Robert Cowan, extension marketing specialist, Washington State College, Pullman, Washington, resigned from the service April 1 to become manager of the Seattle Milk Shippers' Association, Seattle, Washington. Mr. Cowan has been employed by the Washington Agricultural Extension Service for thirteen years. Until he assumed the post of marketing specialist last fall, he served as county agent in several different counties of the State, doing unusually good work in the marketing field. After some graduate work at the University of California in the summer of 1930, he took over the state marketing work, performing it so efficiently that other organizations became interested in his services.

Professor S. H. DeVault, head of the department of agricultural economics at the University of Maryland received the degree of Doctor of Philosophy from Massachusetts State College in June, 1931.

Mr. L. H. Hauter, Assistant Director of Extension and Extension Economist, has been made head of a newly created Department of Agricultural Economics of the New Mexico College of Agriculture and Mechanic Arts. It is expected that four courses in Agricultural Economics will be offered next year. Mr. Hauter will continue his connection with the Extension Service and only devote part time to teaching.

Mr. Asher Hobson, in charge of the Foreign Agricultural Service, Bureau of Agricultural Economics, represented the United States as delegate at the Fifteenth International Congress of Agriculture, held at Prague, Czechoslovakia, June 5-8, and delivered an address on the subject "The Fruitfulness of Research in Forecasting Prices of Agricultural Commodities." The International Congress of Agri-

culture is held every two years by the International Commission of Agriculture, an organization, controlled and financed by 92 national farm groups, representing 27 nations.

Mr. I. S. Hoddinott, Assistant Professor of Rural Economics at Ohio State University, has resigned to enter the employ of the Loan Department of the Mutual Benefit Life Insurance Company.

Professor W. V. Longley, Agricultural College, Truro, N.S., and Mr. Stewart, a prominent lawyer of Halifax, have been appointed by the Nova Scotia Government to work out plans for the improvement of apple marketing organizations, financing warehouse companies and growers in the Annapolis Valley, N.S. The general outline was set up in the recommendations of the Royal Commission which investigated the apple industry a year ago. Legislation providing for a finance corporation was passed at the last session of the Nova Scotia legislature.

Mr. W. S. Middaugh, who received his B.S. and M.S. degrees at Cornell University, was appointed Assistant Extension Economist in Farm Management at Connecticut Agricultural College on March 15, 1931. Complete cost accounts and labor records will be set up for forty or fifty tobacco farms and a determination will be made, not only of the efficiency of each of the farm operations, but also of the efficiency when the interrelationships of the different crops on the various farms are considered. Monthly and yearly summaries will be made and reported back to each farmer.

Mr. E. G. Nourse has resigned the position of chairmanship on the Committee on Fellowships in Agricultural Economics and Rural Sociology of the Social Science Research Council. This work in the future will be handled by I. G. Davis of Connecticut Agricultural College, who has served with the Committee during the current year.

Mr. Paul Nystrom, who has been taking graduate work at the University of Maryland and at the same time making a study of cooperative organizations in Maryland for the Federal Farm Board, has been made Extension Specialist in Agricultural Economics and Farm Management at the University of Maryland, effective June 1.

Mr. Nils A. Olsen, Chief of the Bureau of Agricultural Economics, was one of the official delegates of the United States at the conference of wheat exporting countries held in London in May, and also at the World Dairy Congress at Copenhagen in July. Between these two appointments Mr. Olsen visited the offices of the Bureau of Agricultural Economics in Europe.

Professor L. S. Robertson, of the Purdue University Agricultural Experiment Station, has been granted a year's leave of absence and will take advanced work in agricultural economics at Cornell University beginning September 1.

Dr. J. T. Sanders is making an economic survey of the cotton industry for the Metropolitan Life Insurance Company this summer. Dr. Sanders has been on sabbatical leave from his position as head of the Department of Agricultural Economics at Oklahoma Agricultural and Mechanical College for this past year.

Mr. J. L. Shields, formerly county agent at Walsenburg, Colorado, has been appointed extension economist in farm management at Colorado Agricultural College

and has been assigned to the southwestern part of Colorado. He will be located at Alamosa, Colorado, and will have charge of economic work in farm management in the San Luis Valley and also in the San Juan Basin. Mr. Shields is a graduate of the Colorado Agricultural College and has been engaged in county agent work for several years.

Dr. Friedrich Sohn and Mr. O. A. Negaard, who have been graduate students in agricultural economics at Harvard University during the current year, have accepted fellowships in the Training Division of the Brookings Institution for the academic year 1931-32.

Mr. James E. Thigpen, a graduate of Connecticut Agricultural College, has been appointed Research Assistant in farm management, at Massachusetts State College for the period beginning October 1, 1931, during the absence of Mr. R. L. Mighell who has been granted a Social Science Research Council fellowship for graduate study at Harvard University.

Mr. L. L. Vincent, graduated from Massachusetts State College in June, has been appointed to a fellowship in Agricultural Economics at the University of Maryland for the academic year 1931-32.

Mr. Ernest Wieking, who has been attending Harvard University with the assistance of a Social Science Research Council fellowship in agricultural economics, has been awarded a fellowship at Harvard University and will continue his studies for another year.

EDITOR'S NOTE: Delay in assembling material relative to the candidates for Doctor's Degrees will necessitate running this material in the October issue of the Journal.

Professor W. W. Underwood, extension economist in marketing at Purdue University, suffered fatal injuries in an automobile accident near Martinsville, Indiana, on March 8, 1931, while on his way to Southern Indiana for meetings in connection with his marketing work. Professor Underwood graduated from the University of Minnesota in 1911 and then was successively county agricultural agent in Minnesota and South Dakota, Assistant State Extension Leader in South Dakota, and Assistant Director of Extension in Washington state. In 1929 he returned to the University of Minnesota for graduate work in agricultural economics and joined the staff at Purdue University on August 1, 1930. His eight months in Indiana were marked with great success in laying the foundation for future marketing work in the state.